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Fourth-gen Camaros make great drag cars. The aerodynamic shell is perfect for straight-line shenanigans. **Billy Schwerin** took advantage of the sleek body lines of his 2002 Z28 and armed it with a turbocharged LQ9 worth 976 hp to the wheels. See more of it starting on page 62. Photo by **Grant Cox**.

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FIRING UP

Nick Licata NLicata@enthusiastnetwork.com



These Guys (and Girl) are Good ... Really Good.

Being an editor in the automotive performance publication field for over 10 years now, it's safe to say that I've gotten my fair share of emails from people informing me of their displeasure regarding the job I'm doing. Whether it's the content in general or when we refer to a car being a '68 when it's actually a '69. Hey, the "8" and "9" keys are right next to each other ... it happens. Not all correspondence is negative, though. I do get positive emails at times, but some guys would prefer I be hung by my feet and have rotten tomatoes flung at my naked backside via a potato cannon. Is it deserved? Maybe. It's cool, though. I have fairly thick skin, but keep in mind I take all reasonable constructive criticism to heart, and if it makes sense, I'll apply it to my approach of *Chevy High Performance*. Now, I'm not looking for sympathy or fishing for a bunch of positive, pat-on-the back emails; that's my boss' job. Besides, my somewhat more veteran peers warned me of the dangers associated with this job before I took it. Still waiting on those "atta-boy's" from my boss, though.

Anyway, enough about my insecurity issues. What I really want to talk about is the amazingly talented group of guys (and gal) who contribute to this publication. There's no doubt that I'm fortunate to have the best feature photographers, writers, and tech editors on the planet contributing to *CHP*. Without their detail-oriented hard work, *Chevy High Performance* magazine and *chevyhiperformance.com* wouldn't be enjoying the continued success it's having today. So I think it's important to give these people a shout-out and the props they deserve.

On staff are Steven Rupp and John Gilbert. If these two were let loose with no adult supervision, they would build the best handling and most powerful muscle car with the tightest lines and smoothest paint on the road. *Hmm*. That just gave me an idea for the next *Chevy High Performance* project.

On the freelance tech side, we have some guys who are considered industry legends. Jeff Smith has been around forever, and if you've been reading car magazines for as long as I have, then you'd recognize his name from *Hot Rod*, *Car Craft*, and *CHP*. Dude knows his stuff. We are also fortunate to have engine gurus Barry Kluczyk, Ron Ceridono, and Richard Holdener sharing their vast knowledge with us. Get all four of these guys in the same dyno cell with a pile of

engine parts and there's no telling what would happen, but I'm sure the outcome would be ridiculously insane.

I'm also very proud to have the absolute best feature photographers in the industry. These shooters have the ability to make a 20-year-old paintjob look fresh from the paint booth, and a freshly painted car still appear wet. Yes, they are that good. I'm talking about Robert McGaffin (you've seen his photos just about everywhere), Stephen Kim, Grant Cox, Chris Shelton, and Tim Sutton. Up-and-coming photographers do their best to emulate the techniques of these guys but fail to achieve an outcome of the same quality.

Speaking of features, once you've finished soaking in the incredible photography, do yourself a favor and read the always-entertaining and informative words laid down by Ro McGonegal (he's the absolute best automotive writer in the business - I've been following him since his days at *Super Stock & Drag Illustrated* and *Car Craft* magazines back in the early 1970's). Scribes, Stephen Kim, Chris Shelton, and Chuck Vranas have the ability to sprinkle in just the right amount of witty raillery to turn a basic car feature into the most entertaining prose.

Bruce Biegler's Straight Line Spotlight section is drag racing gold. He's on the road at least 30 weekends a year covering every drag racing event he can, and

always comes back with amazing images and cool racer profiles, along with a mess of burnt rubber attached to his camera.

If you've saved up enough energy to make it through all the features and tech articles, treat yourself to the one-page column titled "Just Sayin'" to end with. This is a unique piece that features a virtual grab bag of automotive (usually) subjects where a regular rotation of the most eclectic personalities (most of which have been, or still are, associated with some sort of auto-related television show, and all have grease, primer, or paint living under their fingernails) in our industry voice their opinion on whatever random subject they choose. You just never know what you'll read from the likes of 11-time SCCA Solo National champion Mary Pozzi (the one that gets me in the most trouble, but generates the most email), walking encyclopedia of automotive history Dennis Pittsenbarger (he starred in *Highway to Sell*), automotive restoration expert Kevin Tetz (you probably remember him from the television show *Trucks!*), and East Coast NHRA drag racing track announcer and co-owner of Bangshift.com Brian Lohnes. Get all four of these people in the same room for a short period of time and there would be a battle to see who'd get the most words in ... I have a good idea on who would win that one.

I can't stress enough about how fortunate I am to have the best writers and shooters contributing to what is the top automotive performance publication in existence. Whether you like Pro Street, Pro Touring, full-on drag cars, autocross, road racers, or just plain badass street machines, what you are looking at is the best this industry has to offer. Don't believe me? Grab a cold one, prop up your feet, and read on.

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FIRING BACK



✦ By **Nick Licata**

★ I'M OUT OF HERE

Dear Mr. Licata,

I have subscribed to *CHP* for a few years and have recently decided to let my magazine subscription lapse. However, I will continue subscribing to *Hot Rod* magazine, *Car Craft*, and *Car & Driver*. My next to last issue is the one that I'm currently reading. I have seen you drive and I'm sure you will do a fine job as the editor, but I thought that I should share my thoughts about the state of these magazines from my eyes, as well as those of my peers.

For starters, I enjoy the feature cars present in each issue. I personally enjoy a good balance of cars from 1950s through the early 2000s. I would like to see some features on newer cars (Zeta II Camaros, C6-C7 Vettes, Chevy SS, and late-model trucks) as long as those cars have more than just a few speed parts bolted on.

I enjoy engine, transmission, and technical articles because I'm a performance guy at heart. I not only know how to read various engine specs, but I have a personal library of engine recipes (matched to specific drivetrain and chassis combos) that span two to twelve cylinders and range from stockish mild to near 10.5 Outlaw and Drag Week wild. This library contains a few hundred unique entries where I've specified everything from ring gap and valve timing to ignition curves and fuel delivery. I bring this up not to brag, but to say that I really enjoy technical detail. I think *CHP* can improve their engine buildups by not writing every article in two parts where you know more about the companies that supplied the parts than why the parts were chosen in the first place. Please do not present articles only to convince readers to purchase parts that are getting increasingly expensive (compare the price of an LS head to that of a brand-new SBC [talk about a saturated market!] or BBC head and you'll see that economies of scale, R&D, and inflation don't account for all of the cost).

Don't get me wrong, I enjoy seeing what is being developed and thinking about what is going to work for whichever project I'm planning – please keep reporting it.

And if you go over any issue of *CHP* from the last few years, you will see that they are frequently repeated articles where the only things that change are the name of the company and part numbers supplied. I can't tell you how many times I've seen an article on changing the

control arms on a 1966-'67 A-body without any thoughts to recording weight differences, comfort/noise levels, and a full handling/braking comparison. It's only occasionally that a magazine runs an autocross time to compare to. Now, I understand that you are dependent on advertisers and are limited in time, budget, and manpower, but surely you can make the advertising either less obvious or more useful. How about an article where you subject the vehicle of your choice through an intense battery of tests (like autocross, slalom, braking, quarter-mile, etc.), and make a comparison between different options, such as factory shock/stock tire versus upgraded shocks/rims versus all-out suspension, stock tire (which I really want to see) versus all-out suspension and rims?

How about testing a variety of limited-slip/locker differentials to see the differences in handling, acceleration, burnouts, cornering noise, and expected durability?

How about fuel economy tests on superchargers, or the difference between a 454 and a 582 in highway mileage, or to see how high you can drive up the mpg of a big-inch performance big-block in a G-body? My money is that you can get 22 mpg with a 502 on the highway while still having the power for 11-second e.t.'s.

As you can see, I really do want this magazine and the others to succeed. I believe the quality is increasing, and I enjoy reading every issue. I'm letting *CHP* lapse because I feel that it is simply regurgitating what I've already read ad nauseam. I do not mean that to be mean, but rather constructive.

While I represent these opinions as my own, they are far from rare or unique viewpoints. If you are willing to incorporate any of these ideas into the magazine, then please let me know and I will gladly re-subscribe.

Ultimately, this magazine is now your ship to run, and you have to make decisions on what to do with it. You have to balance readership, sponsorship, time, and money. As you put it, you're not going to make everybody happy. These are suggestions for how I think enthusiast publications can get better without sacrificing what made them popular in the first place. I sincerely hope that you can see that I am being constructive because I care.

I wish you and your staff the best of luck!

Sincerely,

An Interested Enthusiast

★ US, TOO

Hi Nick,

I just want to relay mine and a couple of my buddies' comments on the new *Chevy High Performance* mag and the general state of all the TEN magazines I (we) subscribe to:

They are losing favor with us!

I am 63 years old, have been subscribing to *Hot Rod*, *Car Craft*, *Chevy High*, etc. since 1965. All the named magazines keep changing editors, format, and the featured cars are becoming more and more high-dollar custom shop builds

instead of home-style builds. The tech articles all feature unobtainium blocks, heads, rotating assemblies, and blowers that most working guys would have to take out a loan to get. I'm not poor, but I have a budget that I can spend on my cars, and still keep up the house and daily life

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FIRING BACK

needs, but that requires some used, some new, and some elbow grease for the cars. That's the reality most working stiffs see!

This month (June 2015), *Chevy High Performance* magazine had 43 3/4 pages of ads out of a total of 82 total pages, and most months are spent on the Chevy LS-series engine and its variants. I realize that you need advertisers to pay the bills and the LS is the hot thing, but development on the SBC, BBC, 348-409 has not stopped in its

tracks. The final blow was when the mag stopped Kevin McClelland's tech column and changed editors again.

I don't use social media – this is as hi-tech as it gets for me – and I like to read a paper magazine and keep it for future reference, but I'm sorry to say that I will not renew my *Chevy High*, *Hot Rod*, or *Car Craft* subs when they run out!

Thanks for your time.

Jim Taylor

Via email

★ I'LL STAY

Nick,

Just had to drop a line with my opinion on the mag's direction. I subscribe to one mag at the moment: this one. The others just seemed to go to the ultra-high end cars and products that the average guy cannot afford. I do anything I can safely do myself that will have a respectable outcome. The rest will be left to the people capable of the job I need done. This mag started out with a lot of tech info and articles on upgrades or repairs for the people doing the work themselves and has pretty much stayed on course. I can't, and will not have, or need a \$20-\$30k engine. It's fun to see engines pushed to the limit and I know some live and breathe the \$200k show cars, but most of those cars birth out of high-end shops with the owner's involvement being a general direction and an open door to their bank, so occasional articles with these cars and engines are great. Just don't make it the meat and potatoes of the magazine. I hope you can keep an open mind and remember the average guy or girl won't be able to do this.

I'm reading the March 2015 issue as I'm writing this, and if this is a typical issue you are happy with, then I say 'welcome aboard!' It has a great mix of articles, I know nothing's cheap these days, but stuff can be done without mortgaging the house, and that's what I like to see.

Thanks for your time and good luck.

Timothy Ward

Via email

Thanks, Tim,

After the beating I just took from the previous readers, I really appreciate the kind words. -Ed

★ DO THE MATH

No Big Mac, no Q&A. Nothing but LS cars and tech articles = No subscription renewal. Too bad, I've been a subscriber for what seems like decades.

Howard DeSchryver

Via email

★ POTTY MOUTH POZZI

Hi Nick,

I almost never write in about a magazine issue, especially to my



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favorite *CHP*, but I have a beef. Potty Mouth Pozzi's article "Just Sayin" (June 2015 p.82) was not something befitting a class magazine like yours. I am a 70-year old long-time subscriber, and I did not appreciate her garbage-can literacy.

Thanks for listening,
Dave Coates
 Muskegon, MI

Dave,
 Thank you for giving her a new nickname. This one's gonna stick.-Ed

★CAMARO LOVER

Hi Nick,

I just read your first Firing Up column, and let me start by saying congratulations on your new title at *CHP*. I know you will do fine. I followed you while you were editor of *Camaro Performers* for years. I have two Camaros myself: a 1981 Z28 and a 1984 Z28 Pro Street.

Anyway, in response to your column, I would like to see some stories on the big-block engines. In the past, *CHP* has been good at bringing a lot of different Chevys, which has been great. Personally, I'm into drag racing, but as any car guy I love reading about all cars—make that all Chevys.



I have a couple of questions: Will you be writing about your fourth-gen Camaro, Black Betty in *CHP*, and are you going to continue with the Third-gen Camaro that Henry was building for the 10.5 class.

I also want to let you know what a great job you're doing. I just read the March 2015 issue and love the driveway tech. Not too many of us average-type people want to remove the engine to clean up the engine compartment.

Thanks and good luck,
Joe Nappi

Joe,
 The 2001 Camaro we built in

Camaro Performers, known as Black Betty, will be going out to greener pastures. We've pretty much done everything we wanted to on it and it's such a fun car to drive as it is, we don't want to over-do it. We all know how easy it is to go a little too far and take a perfectly good street car and make it totally unstreetable.

As far as Henry's third-gen Camaro goes, that car has moved on, so we

don't have any plans to do any more articles on that car.

Since you brought up Camaro Performers, we will be bringing in Project Orange Crate, our 1971 Pro Touring-style Camaro into the roster. The car is about 90-percent complete and we hope to have it on the road by the time you read this. We are really looking forward to getting that car out to quite a few driving events this year.-Ed

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STRAIGHT LINE▶

SPOTLIGHT

❖ TEXT & PHOTOS: **Bruce Biegler**

Southeast Short Track Specialist

❖ Palm Beach, Florida, is home base to a very impressive 1969 Camaro, which sees a lot of action in a unique and regional racing circuit. Troy Blake campaigns his single-carb, nitrous-assisted machine in the creative Outlaw 632 class, which features a number of independent eighth-mile events each season, located mostly within the Southeast. With his striking silver machine, Blake is both a frequent runner and frequent winner within that tour (as of press time, he has four wins in 2015). The car was originally built in 2011 by KB Race Cars and raced by Jeff Colletta in NMCA Pro Street. Troy acquired the car in 2013 and has been running it ever since. To keep within the class rules, which encourage a variety of machines with unlimited tire size and heads-up



racing, Blake's machine uses a 640ci engine (by Terry Williams) and his car tips the scale at 3,050 pounds. The car has run a best eighth-mile e.t. of 4.43 at 165 mph. Troy credits his ongoing success to the tuning expertise of his crew chief Todd Trimaldi as well as the support of crew members Hank Hill; Jimmy "V"; and girlfriend, Bryn.

Showcased Craftsmanship

❖ Ken Keir — founder, owner, and operator of Maryland-based Ken Keir Race Cars — lets his race car do the talking. He and his son Adam campaign in both the NHRA and IHRA circuits in Stock Eliminator with a truly remarkable 1970 Nova, a machine which is hands-down one of the fastest A/SA-classed cars in the world. The car features stunning craftsmanship from bumper to bumper and a 402ci engine program built by Joe Clark that propels the hard-leaving and high-flying machine to consistent runs in the mid-to-high 9-second zone. The team transfers all that power using an ATI converter in front of a three-speed automatic transmission (built by Leon Miranian),



ultimately to Mickey Thompson tires. The Nova's finished look is pretty much perfect, with the predominately orange paint scheme applied by Imagine That Customs (Mechanicsville, Maryland). And with that, the car has gobbled up both Best Engineered and Best Appearing event awards.



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A Nice Touch Corvette

✶ The popularity of flip-top 1957 Corvette Super Gas cars is a certainty, and one of the nicest ones anywhere is the Don Davis-built machine raced by the husband and wife team of Don and Cynthia Lang (Northridge, California). After purchasing the car as a rolling chassis from reputed builder Jerry Colton, the Lang's car has emerged both as a competitive car and show-stopping final product. The team, which focuses most of its event attention within NHRA Lucas Oil Drag Racing Series Division 7, uses a 582ci engine expertly constructed by Sunset Racecraft. That engine program is bolted to a Hughes Performance torque converter and Powerglide transmission to consistently chase their 9.90 class index. This Corvette design offers up a number of advantages for Don and his team, not the least of which is improved visibility for the driver and ease of maintenance between rounds. While on the circuit, Lang benefits from the help of his dedicated crew of friends Devon Hilton, Dave Drew, Dave Gotts, and Kevin Kleineweber.

International Power Play Continuum

✶ The world's Pro Modified class envelope continues to be pushed to the limits by the dynamic Middle East-based Q80 Racing Team. The team was founded by Shaikh Duaij Fahad Al-Sabah, and this year — depending on event scheduling — features drivers from the U.S. (Eric Dillard), Dominican Republic (Jose Gonzalez), and Kuwait (Turky al Zahiri). The Q80 Racing Team first came to big-time notoriety when they clobbered the worldwide quarter-mile record for Pro Mod-type cars last summer. Racing their 481X twin-turbocharged Pro Line Racing-powered 1969 Camaro,

they sent shock waves with an unheard of quick and fast 5.47 e.t. at over 272 mph run last year (in Outlaw Pro Mod trim) while racing in St. Louis. Now in 2015, the team has added an eighth-mile all-time speed record for the genre to their resume. They clocked a speed of 227.84 mph while racing in Pro Extreme during the PDRA's spring event held in North Carolina. The team's remarkable rise to this performance level has come with pedigree tuner Steve Petty's influence, and expectations are that the 4,000hp (!) Camaro is still ripe for more. Can you say "280-mph door-slammer?"



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❖ TEXT: **Ro McGonegal** | PHOTOS: **Robert McGaffin**



➔ **We see tons of hot cars** at *CHP*. Though body style and paint tacitly distinguishes one from the rest, on the main they are animals of the current vogue and use slight variations of the same equipment ... all under the web of popular notion. Though the numbers are vast, a few do exhibit thoughtful attempts at originality, which handily separates them from the pack. We applaud the originality that was the core of ancient hot rodding, when people first used their minds, their hands, and what rudimentary tools they had (the hot wrench right on the top of the pile) to make the stuff they needed.





Even in this multibillion dollar aftermarket, where anything is possible and everything is store-bought, there are nuances. Old hands have seen, read, and heard it all to the point of projectile vomiting. The hacks (me) that write car features for *CHP* and other periodicals on a constant basis are acutely aware of this, and when we notice a needle winking in the sun right next to the haystack, our foreheads uncrease and we sip an ice-cold beer and rejoice.

Ol' Gary Geiger didn't give his age, but we suspect he's thrashed a hot car or two along the way. "I did the Nova for many reasons, among them memories of younger years and to see how nice of a car I could build now. But mostly it was for the love of it. I got in it like a son whose dad loved cars."

His maturity has calmed him. No rush to get it done. He's enjoying the journey and has no final destination in sight. "I've been building this Nova for 14 years. I wanted something that was a driver and that could be built a little at a time. Not being able to afford one that was done, I knew it would be difficult to find a solid car. I was thumbing an issue of *Hemmings* one afternoon and found the car ... and it was in my area code.

"It's funny how things work out. After all that searching, the car was five miles from me, gold-on-gold with a vinyl roof, 307 motor, and factory air. I remember saying to myself that it was one ugly turd. It came from Visalia, California, and had been shipped to Indiana a couple of months prior. It showed 66,000 miles on the odometer, it was straight everywhere, and there wasn't a spot of rust anywhere." The eventual crew included friends Jim Ford, John Amick, Wade Sellars, and Shirley Melloh.

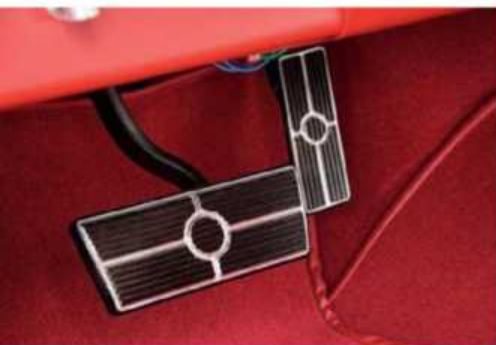
Although Gary wanted a tuxedo-sharp exterior (as executed by Dan South and Mark Ross at Miner's Body Shop in Indianapolis), he wanted to keep it stock and have the deep ebony paint do all the talking, so he and his warriors dove beneath it.

They installed some of the chassis components and made adjustment and had Indianapolis heroes do the rest. Paradise Road Rod & Custom on East 25th St. introduced the solid body bushings, DSE subframe clips, QUADRALink suspension, Panhard rod, and mini-tubs. The Moser 9-inch was fitted with a Detroit Locker differential, 3.89:1 gears, and 35-spline shafts. Before they quit the back forty, they dropped in the DSE coilover dampers. Gary and friends rebuilt the stock front suspension without any aftermarket pieces save for the AFCO shock absorbers.

Then Gary deviated from the norm ... spectacularly. While he could have used any engine configuration, especially the mega-trendy LS platform, he went with a big small-block built by Tim Linder at prolific







M&M Competition Engines out on Five Points Rd.

That needle next to the haystack is a cool, serious beauty raised from a Dart Iron Eagle small-block that's out to nearly 450 cubic inches. Eagle crank and rods and Diamond pistons cycle within and that COMP solid roller nudges the mandatory shaft rocker system. The hook? Cylinder heads that were once NASCAR-exclusive. They're the sexy SB2.2 castings with 11x4-degree intake and 8x0-degree exhaust valve angles and produce flow numbers like a big-block. Sure, they require different pistons for the left and right banks, among other anomalies, but are optimum for a single-carburetor application. Expensive? You think? Gary says that the most challenging part of the buildup was "paying for the motor." On top of that, he dropped some more shekels on a little insurance: an Induction Solutions 150-shot. Best

times? On the motor it went 10.91 at 121; on the jolt, it peels 10.16 at 135. For utmost in consistency, Mike Walls built the Nova a Turbo 400 and gave it a reverse manual valvebody and a 10-inch Neal Chance converter.

Gary had his bud Wade Sellars fabricate a dash insert from 18-gauge steel for the Auto Meter gauges. It assimilates like a birthright and it subtly coincides with the rest of the tableau that is nothing if not scrumptious. Jim Mathews at Indy Auto Trim in New Palestine, Indiana, worked the room, splashing crimson over the seats, the low-nap Daytona weave carpeting, and the door panels. Tight, streamlined, and sophisticated it is.

"After 14 years of beating on it in the summertime and upgrading it over the winter, I have what you see here," chortled Gary. "You know, I think I might just have to take a break now and go flog on her some more. Ha ha." **CHP**

TECH CHECK

Owner: Gary Geiger, Indianapolis, Indiana
Vehicle: 1970 Nova

Engine

- Type:** Dart Iron Eagle small-block
- Displacement:** 427 ci
- Compression Ratio:** 10.2:1
- Bore:** 4.155 inches
- Stroke:** 4.125 inches
- Cylinder Heads:** GM SB2.2 aluminum, 2.150/1.625 valves, 48cc combustion chambers
- Rotating Assembly:** Eagle 4340 crankshaft and 4340 H-beam rods, Diamond pistons, Total Seal rings
- Valvetrain:** COMP Cams solid roller lifters, Jesel shaft rocker system
- Camshaft:** COMP Cams, 0.609/0.609-inch lift; 256/264-degrees duration at 0.050

- Induction:** GM 048 aluminum manifold, aluminum valley tray, 1,000-cfm Pro Systems 4150 carburetor, stainless steel lines, Rick's stainless tank, Aeromotive Stealth 340 pump, Induction Solutions 150-shot
- Ignition:** MSD Digital 6, Taylor wires
- Exhaust:** Lemons headers with 2-inch primaries and 3-inch collector, Holley X-pipe, Flowmaster 40-series mufflers
- Built by:** Tim Linder, M&M Competition Engines (Indianapolis)
- Output:** 630 hp at 7,400 rpm, 590 lb-ft at 3,900 rpm

Drivetrain

- Transmission:** 1970 Turbo 400 by Mike Walls at Bradley's Transmission (Indianapolis), reverse manual valvebody, 10-inch Neal Chance converter with 3,500-stall

- Rear Axle:** Moser 9-inch, Detroit Locker, 3.89:1 gears, 35-spline axles, 3-inch propeller built by Patterson's Driveshaft (Indianapolis)

Chassis

- Steering:** GM OE recirculating ball
- Front Suspension:** GM spindles, rebuilt OE suspension, AFCO shock absorbers
- Rear Suspension:** DSE subframe connectors, QUADRALink, Panhard rod, coilover shock absorbers
- Brakes:** GM OE, stainless steel lines, Wilwood master cylinder and proportioning valve

Wheels & Tires

- Wheels:** American Racing Salt Flat Special; 15x4 front, 15x10 rear

- Tires:** Mickey Thompson; 26/6.0 Sportsman S/R front, 325/50 Street Radial rear

Interior

- Seats:** OE
- Upholstery:** Leather by Jim Mathews (New Palestine, Indiana)
- Gauges:** Auto Meter Sport Comp, steel dash insert by Wade Sellars
- Steering Wheel:** GM
- Carpet:** Daytona weave
- Shifter:** Hurst Quarter Stick

Exterior

- Body Prep/Paint:** Miner's Body Shop (Indianapolis), Dan South, sheetmetal; Mark Ross, paint; PPG Black
- Hood:** Harwood 4-inch cowl

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AUTOMATIC ANSWERS

We Explore 12 Common Questions and Misconceptions About Automatic Transmissions

✦ TEXT: **Barry Kluczyk** | PHOTOS: **Barry Kluczyk and courtesy of the manufacturers**

Forget things like nuclear power, lasers, and freeze-dried ice cream. When it comes to back-engineered alien technology, the automatic transmission is a marvel of seemingly otherworldly intelligence. General Motors introduced the first Hydramatic transmission in the 1940 Oldsmobile. That was seven years before the Roswell incident, but who knows? Maybe flying saucers had been buzzing around Detroit the previous decade and the one that supposedly crashed in New Mexico simply burned up a couple of clutch bands in its intergalactic slushbox.

Amazingly, the basic design of the modern automatic transmission hasn't changed much from the early Hydramatics introduced 75 years ago – and they're still the source of confusion and apprehension among enthusiasts who view their workings and performance nuances as a black art.

There's not enough room here to explain everything about the design, operation, and performance capabilities of automatic transmissions, but in this second in a series of explanatory features, we answer some of the most common questions and explain the more misunderstood aspects of GM automatic transmissions and related performance features.

Don't worry. There are no alien probes involved.

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1. IS THERE A BIG DIFFERENCE BETWEEN A TURBO 350 AND TURBO 400 - AND WHICH ONE DO I WANT?

They are completely different transmissions. The Turbo 400 is larger, longer, and heavier than the Turbo 350 and was designed to live behind higher-torque applications such as big-blocks. That doesn't mean the Turbo 350 is weak in comparison. In fact, with all of the enhancements from companies such as TCI Automotive, Performance Automatic, and Hughes Performance, both transmissions can be built to match very high power levels. When it comes to picking one





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Automatic Answers

01 | The Turbo 350 (top) and the Turbo 400 (bottom) are the quintessential GM automatic transmissions. Both are three-speeds, but the Turbo 400 is physically larger and designed more for the torque capacity of big-block engines.



03 | The Hydramatic 200-4R (shown) is a good swap choice, but isn't as easy to find as a 700-R4.



for your vehicle, we'll always side with lighter and smaller whenever possible. You'll also want to consider what type came originally equipped in the car. Changing to a Turbo 400 in an original Turbo 350 car will require mounting/crossmember modifications and likely a shorter driveshaft. If you're worried about the ultimate strength of the transmission, consult one of the transmission specialists for upgrades.

2. WHY IS THE POWERGLIDE TRANSMISSION SO POPULAR IN DRAG RACING?

In the high-tech 21st century, it seems antithetical that racers would rely on an archaic, two-speed automatic gearbox, but there are several good reasons: simplicity, low inertia, and versatility. The simplicity of the Powerglide makes it easier and faster to work on, while contributing to lower weight than three- and four-speed transmissions. Only two gears means less inertia is required to spin it, too, which translates into more power getting to the pavement. As for versatility, there are tons of available

First gear ratios that make it easy to tailor the trans to the rest of the engine and drivetrain elements – and a big-torque engine doesn't need numerically high gear ratios to get the car launched, so the simple Low and High gears are ideal for a quick blast down the strip.

3. WHICH IS BETTER: THE 200-4R OR THE 700-R4?

This is one of those questions akin to asking who in your town makes the best pizza. Everybody has an opinion and they're not necessarily wrong. The 200-4R was introduced in 1981 and its design roots lie in the Turbo 350. In fact, its overall size and length are comparable to the TH350, which makes swapping one comparatively easy into a vehicle originally equipped with the Turbo 350. The rear crossmember has to be relocated, but the original driveshaft can be retained. The 700-R4 debuted in 1982 and was renamed 4L60 in 1990. It offers comparable performance characteristics to the 200-4R, but it's a longer transmission and a swap into an older vehicle requires a new crossmember and a shorter driveshaft.



02 | A mainstay of drag racers decades after it went out of production; the simple, durable two-speed Powerglide continues to send drag racers down the strip.



04 | The 4L60 series is the 350 small-block of overdrive transmissions – it fits everything and is durable and economical.

In the 700-R4/4L60's favor is economy of scale. They were made in the millions and for much longer than the 200-4R, so used examples are plentiful and cheap. The 200-4R is getting a little harder to find these days.

4. WHAT ABOUT THE 4L60 SERIES OVERDRIVE TRANSMISSIONS? ARE THEY BETTER THAN A 700-R4?

See #3 above. The 4L60 and the 700-R4 are the same transmission. General Motors changed the name in 1990 to 4L60 as part of a new naming convention that continues today. The 4 stands for four-speed, the L stands for longitudinal (i.e., the north/south orientation of the powertrain in a rear-drive vehicle), and the 60 stands for the relative torque capacity. Some suggest pre-1987 700-R4 transmissions are more problematic than later editions, but that's not a universal belief. Higher-torque versions of the family include the 4L65E and 4L70E, which have five-pinion gearsets versus the 4L60's four-pinion design, for enhanced strength.

5. WHAT ABOUT THE 4L80 SERIES?

Just as the 200-4R was an extension of the Turbo 350, the 4L80, which was introduced in 1991, was developed on the Turbo 400 architecture. That means it has a different case design and dimensions and is not simply a high-torque extension of the 4L60 – although the

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MEMBER



05 | The 4L80 family is the choice for big-block engines and has its roots in the Turbo 400.



06 | GM's electronically controlled transmissions take their gear-change commands from a stand-alone controller and require a separate, aftermarket converter to work with mechanical speedometers.



07 | The maze of channels in a valvebody directs fluid that controls the valve actuation for each gear change.



08 | Shift kits basically reduce the mushy feeling built into a production transmission for smoothness, adding snap to the gear changes for a firmer, more positive feel. Reducing slippage can also prolong the transmission's life.

families are surprisingly close in overall length and width. And like the Turbo 400, the 4L80 was designed for higher-torque applications. Consequently, it is heavier than the 4L60.

6. WHAT'S THE DIFFERENCE BETWEEN THE 4L60 AND 4L60E - AND 4L80 AND 4L80E?

The "E" versions of the 4L60 and 4L80 series transmissions are electronically controlled, meaning a powertrain control module directs solenoids inside the valvebody to activate the valves, compared to the completely mechanical operation of the non-E versions. Using the E versions in an older car requires a complementing controller. The E versions also use an electronic speed sensor to relay information to the speedometer. Signal converters are available to adapt the electronic output for use with conventional mechanical speedometers.

7. WHAT IS THE TRANSMISSION'S VALVEBODY?

It is the nerve center of an automatic transmission. It's basically a maze of

channels and passages that funnel hydraulic fluid to various valves that, in turn, activate the appropriate clutch pack or band servo. Each valve has a specific job, such as activating the upshift from Second gear to Third gear, while another valve controls the downshift from Third to Second. With a computer-controlled transmission such as the 4L60E, electronically activated solenoids are mounted in the valvebody and direct fluid to the clutch packs or bands.

8. WHAT DOES A SHIFT KIT DO FOR PERFORMANCE?

Different types of shift kits are designed for different tasks, but generally speaking, a performance-type shift kit is designed to provide firmer-feeling shifts by altering the fluid flow and other elements in the valvebody. While actual vehicle performance (i.e., acceleration) may not be significantly affected, the result is typically a greater feeling of precision. A shift kit can also help reduce wear by reducing the slippage and shift overlap built into many transmissions to give them smoother-feeling shifting. And while it is technically a bolt-on project, it can

be an involved one, including spring replacement and even drilling out fluid passages in the valvebody.

9. IS A MANUAL VALVEBODY WHAT I THINK IT IS?

If you believe it allows the driver to shift an automatic transmission manually, you're correct. But unlike clicking up through the low gears in your street car, a manual valvebody totally eliminates the automatic shifting function and puts full gear-change control in the driver's hand. That means the transmission won't automatically shift at all. It's designed for racing, allowing much greater line pressure that makes it harder for the clutches to slip under high loads. Although some hard-core enthusiasts run manual valvebodies on the street, they're really best left to the dragstrip, off-road course, or perhaps the monster truck you've been dreaming of building since fifth grade.

10. WHAT, THEN, IS A REVERSE-PATTERN VALVEBODY?

It's a modification that reverses the shift pattern for a manual-control



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09 | A manual-control valvebody eliminates the automatic gear changes in an automatic transmission — and it's really designed for the strip, not the street.

automatic, meaning First gear is right below Neutral and the high gear is the farthest from it. The idea is for a more natural-feeling shift pattern on the dragstrip, while preventing inadvertently shifting into Neutral — or worse, Reverse — when clicking up through the conventional automatic shift pattern.

11. WHAT IS A TRANSBRAKE AND HOW DOES IT WORK?

A transmission brake valvebody is designed for hard, optimal-rpm launches at the dragstrip. It's an electrically controlled device that, when activated, simultaneously holds the transmission in First and Reverse gears, "locking" the transmission and allowing the driver to bring up the engine rpm without holding his or her foot on the brake pedal. When the transbrake is engaged, there's no torque sent to the driveshaft, so the suspension remains unloaded, which is also better for the launch, and without the need to hold the brake it prevents the car from inadvertently creeping forward through the staging lights. The driver releases the transbrake as the lights come down on the Christmas Tree, disengaging Reverse and launching the vehicle forcefully and at the optimal rpm. Think of it as the automatic transmission equivalent of revving the engine and dumping the clutch.

12. SO, WHAT THEN IS A DELAY BOX?

Essentially, a delay box is a timer partnered with a transbrake, designed to help the driver launch with a better reaction time. Without a delay box, the car launches as soon as the

11 | A transbrake allows a vehicle to achieve the maximum converter stall for higher-rpm launches — much like a high-rpm clutch-dump launch with a manual transmission. This one is from TCI Auto.



12 | Using a delay box can make a car deadly consistent, with near-perfect launches, but some believe it minimizes the human element in racing.

driver releases the trans brake. With a delay box, the driver can dial in a countdown before the trans brake releases. If the delay is timed just right, the car will launch with a perfect or near-perfect reaction time. This is a simplified explanation, because there's quite a bit of math involved with determining the optimal delay



10 | When clicking through the gears with manual control, a reverse-pattern valvebody can be more intuitive and prevent inadvertently shifting into Neutral.

timing. There are even crossover boxes that enable bracket racers to factor in their opponent's dial-in — more math there. Delay boxes have always been controversial, because of the perception they take much of the human factor out of racing. We tend to agree, but the devices are here to stay. **CHP**

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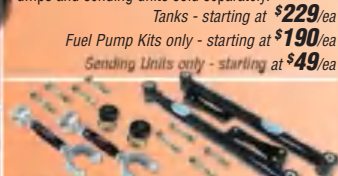
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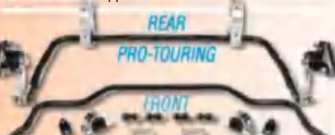


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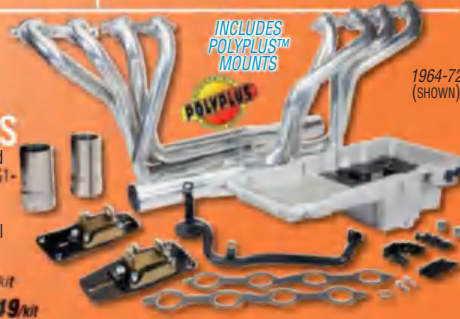
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➤ **Evidently, when you take stuff** out of the ground for next to nothing then sell it for an obscene price, the profit margins are quite good. No wonder stealing thy neighbor's goodies — whether the commodity in question is gold, oil, opium, or tea — is a habit that humanity has a tough time kicking. Although the factors contributing to the frosty relations between the Western world and the Middle East are many, oil is one of them. Interestingly, the same commodity responsible for driving a wedge between both cultures can also bring them together. With big oil comes big money, and rich dudes of all shapes and sizes love horsepower, burnouts, and powerslides. Granted, Italian and German exotics seem to be the tools of choice for performing acts of automotive hooliganism in the Middle East, but somewhere in Saudi Arabia you'll find an LS7-powered 1969 Camaro mixing it up with the big boys. If Saudi Arabia-based Torque Speed Automotive gets its way, this is just the beginning.

A few years back, the halls of Schwartz Performance hosted a very interesting meeting that outlined some very ambitious goals. A Midwestern gentleman approached them with the idea of exporting 1969 Camaros done up Pro Touring style to the Middle East. His plan was to open up a shop in Riyadh, Saudi Arabia, and specialize in importing late-model American production cars as well as old-school Detroit iron. He needed a shop stateside capable of building a Pro Touring Camaro packed to the brim with an LS7, a six-speed trans, a cutting-edge chassis, and all the modern comfort and convenience



UNIT



features that super wealthy oil tycoons demand. After smacking down Lamborghinis and Ferraris on the dusty Arabian backroads, the plan was to build a production run of Camaros to export. Schwartz Performance would be tasked with performing the metal fabrication as well as the major mechanical work, while the paint

and bodywork would be completed once the cars arrived at Torque Speed Automotive in Saudi Arabia. Oh yeah, plans called for selling the cars with a full warranty, too.

As a shop that's earned a reputation for building functional Pro Touring machines that can actually hold their own around a racetrack, Schwartz

Performance eagerly accepted the challenge. Upon taking delivery of a mostly straight '69 Camaro shell, the crew got to work. Due to the brutally hot desert climate the car would operate in and the incredibly demanding needs of the car's target clientele, building Torque Speed Automotive's first production Camaro



ED NATIONS

In the Not-So-Distant Future, 650hp Camaros Could be Laying Patch in the Streets of the Middle East

✦ TEXT: **Stephen Kim** | PHOTOS: **Gary Gerstner**

presented some unique design considerations. Blistering acceleration and supercar handling was a given, but the car had to also coddle its occupants in a sumptuous cabin replete with every modern convenience feature in the book. “We fitted the Camaro with a 1,000hp capacity radiator, dual electric fans, and a massive transmission cooler,” Jeff Schwartz explains. “Not only are the headers ceramic coated, but the rest of the exhaust system is as well. To keep heat from entering the cabin, we lined the car with much more heat and sound insulation than we normally use.”

Since isolating the interior from ambient heat is only half the battle, the next step was making it cool in more ways than one. A Vintage Air A/C system took care of the temperature portion of the equation, but hours upon hours of custom fabrication were required to create a one-off interior. “The interior looks nothing like a stock Camaro,” says Jeff. “We custom-built the dash, door panels, and center console and covered it all in leather. Red-faced Classic Instruments gauges sit inside a custom instrument panel. The seats are custom Recaros, and there’s a combination of leather and suede throughout the interior.”

Nevertheless, sleek lines and a stunning interior mean nothing in a car that still drives like a 1969 Camaro. Striking a balance between precise handling and a smooth ride is imperative in any performance car, and even more so in a machine targeted at such a privileged demographic. “The primary focus was building a car that’s not just fast, but is also streetable and practical. It’s easy to run stiff springs on a smooth track, but if you try to drive a car with that same stiff setup on the street, it’s going to rattle your teeth out,” Jeff explains. “We prefer to run softer springs and use stiffer sway bars. That way, the car doesn’t get upset if it hits a bump and it rides much nicer on the street.”

Many, many years of road racing in SCCA and IMSA have taught Jeff that when building a chassis, it’s often best to start with a clean slate. This explains why his company has developed a full line of aftermarket muscle car chassis. As such, correcting the flawed suspension geometry of the original stock Camaro chassis is as easy as plucking a new Schwartz G-Machine chassis out of the shop’s inventory. The new hardware essentially replaces the front subframe and converts the unibody Camaro into a full-frame car. The solidified foundation anchors twin Schwartz A-arms up front and a Schwartz four-link assembly out back. RideTech long-travel coilovers offer excellent ride quality, while Schwartz



sway bars minimize body roll. Massive 14-inch Baer disc brakes provide copious stopping power, while 18-inch Forgeline wheels wrapped in BFGoodrich rubber plant it all to the pavement.

Regardless of where you live in the world, man does not live by handling and braking alone. In a land where law enforcement patrols the streets in Lamborghinis, blistering acceleration is imperative. Consequently, the Camaro was fitted with one of Schwartz’s proven LS7 packages. The combination is based on a Chevrolet Performance LS7 small-block, but has been further enhanced with ported cylinder heads, chrome-moly pushrods, and a 242/248-at-0.050 hydraulic roller camshaft. The result is a stout 650 hp at 6,800 rpm and 568 lb-ft at 5,400 rpm. Torque-splitting duties are handled by a paddle-shifted TCI Automotive 6X six-speed automatic transmission matched with a 2,800-stall converter. “If you have 650 hp in a 3,600-pound Camaro, it’s going to keep up with just about any exotic car out there,” Jeff opines.

Today, the Torque Speed Automotive Camaro — serial number TRQ 001 — prowls the streets of Saudi Arabia, snacking on various European delicacies. With wide-open highways, dirt-cheap fuel, and tons of oil money to play with, the Middle East is a car guy’s dream. Something tells us that it won’t be long before TRQ 002 sets sail for Saudi Arabia. What better way to stand out in a sea of exotics than in one of the most strikingly gorgeous muscle cars of all time? Evidently, the universal lust of horsepower, burnouts, and powerslides knows no boundaries, differences in creed and color be damned. **CHP**

TECH CHECK

Owner: Torque Speed Automotive, Riyadh, Saudi Arabia
Vehicle: 1969 Chevrolet Camaro

Engine

- **Type:** GM LS7
- **Displacement:** 427 ci
- **Compression Ratio:** 11.0:1
- **Bore:** 4.125 inches
- **Stroke:** 4.000 inches
- **Cylinder Heads:** GM LS7 rectangle-port aluminum castings
- **Rotating Assembly:** GM forged steel crank, titanium rods, hypereutectic pistons
- **Valvetrain:** Factory GM roller lifters, rockers, timing set
- **Camshaft:** Custom Schwartz 242/248-at-0.050 hydraulic roller
- **Induction:** GM LS7 intake manifold
- **Ignition:** GM coil packs, MSD plug wires

- **Exhaust:** Schwartz stainless steel headers and dual Borla 3-inch mufflers
- **Output:** 650 hp at 6,800 rpm and 568 lb-ft at 5,400 rpm

Drivetrain

- **Transmission:** TCI Auto 6X six-speed automatic and 2,800-stall converter
- **Rear Axle:** DS 9-inch, 31-spline axles, limited-slip differential, 3.89:1 ratio

Chassis

- **Steering:** Schwartz rack
- **Front Suspension:** Schwartz full frame conversion, control arms, and sway bar; RideTech coilovers
- **Rear Suspension:** Schwartz four-link, RideTech coilovers
- **Brakes:** Baer 14-inch rotors and six-piston calipers, front and rear

Wheels & Tires

- **Wheels:** Forgeline GA3; 18x8 front, 18x12 rear
- **Tires:** BFGoodrich KDW; 255/35 front; 335/30 rear

Interior

- **Seats:** Recaro
- **Audio:** Alpine
- **Upholstery:** Leather (Shane Cassin, Woodstock, Illinois)
- **Gauges:** Classic Instruments
- **Steering Wheel:** Momo
- **Carpet:** Custom black
- **Shifter:** B&M

Exterior

- **Body Prep/Paint:** GM Black, KDX Auto Painting (Lakemoor, Illinois)
- **Hood:** Stock GM

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REINCARNATION

Fresh Braking, Steering, and Suspension Parts Turn This 1967 Chevelle Into a More Credible Street Performer

♦ TEXT & PHOTOS: **Steven Rupp**

Old cars suck to drive. Now that I have your attention, let me explain. It's not like they were awful to drive back when they were new in the 1960s, but compared to what we have today, the performance pales in comparison. After all, the suspension, steering, and braking technology from four decades ago didn't lend itself to razor-sharp performance, or even spork-sharp performance. Add in the wear-and-tear factor and it's amazing they handle and stop as well as they do.

Thanks to the aftermarket it's easy to stuff modern performance into our classic Chevys (certainly easier than trying to give any modern car classically cool, good looks). Of course, many of these options, aside from being very expensive, involve welders and cutoff wheels. But there are bolt-on solutions for those on more wallet-friendly budgets.

Included into the handling category are steering components. After all, even a car with a great handling package will be miserable to drive if it has vague, unresponsive steering.

So, we opted for Classic Performance Products' (CPP) Stage-IV Pro-Touring kit (PN 6467PTK-4, \$3,599). This system includes front and rear tubular control arms, billet single-adjustable coilover shocks, brakes, spindles, front and rear performance sway bars, and a host of other parts needed for the installation. The 1967 Chevelle we chose for this install was rolling on stock front disc and rear drum brakes, so its ability to stop was sketchy at best. Fortunately, the Stage-IV

kit came with CPP's Big-Brake system, which included rotors, calipers, C5 bearing hubs, C5 spindles, parking brake cables, brake lines, brackets, and everything else needed for a high-performance four-wheel disc brake system. To this we added a 500 series steering box (PN CP50004, \$380) along with some fresh components to replace the worn-out stuff.

Now, a big pile of new powdercoated parts is cool and all, but we wanted to see what the gain would be from such expenditure. And while these kits are pure bolt-on deals, there are a lot of parts, so we broke the install into two parts. And while our handling venue was closed to testing, we did manage to test out the before and after braking performance. **CHP**



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01 | Prior to the install, we took our subject 1967 Chevelle and did some “before” brake testing and also got a feel for how it handled around town. The steering was vague and over-assisted, which was not a good combination. But it was the brakes that felt really bad. From 60-0 mph it took over 177 feet to come to a stop, and that was on the first try. After a couple of hard stops, the brakes went on vacation and we were well into the 200-foot zone. Even worse is that the rear brakes would easily lock up, which made the car unstable. In fact, on the third try, the 3,700-pound Chevy almost spun around.

02 | Our Chevelle ran 15-inch Rally wheels around its stock brakes. Unfortunately, those wheels were a “no-go” with the new bigger binders. Our solution was to pick up a set of affordable 18-inch polished Streeters by Showwheels and wrap them in some fresh radial tires, which made the stock disc brakes look even more puny. In the interest of fairness, we retested the car with the better tires and there was an improvement in stopping distance (a best of 158 feet), but the Chevelle was still very unstable, and after a couple of hard hits, the pedal was going to the floor.



03 | The new twin-piston calipers will be a huge leap forward from the old brakes, and the zinc-washed, drilled, and slotted rotors should work as good as they look. In the Pro Touring Stage-IV kit, the spindle, bearing, and caliper come completely assembled and ready to bolt on. Before getting started, we checked the assembly to make sure the caliper cleared the wheel and found we needed a small 1/8-inch spacer. Note that the spindle steering arms are not included in the kit since you can use your stock arms. CPP sells them (PN 6467SP-A) for \$69 per pair.



04 | It was then time for the part we hate, namely, removing the coil springs. We couldn't get our spring compressor in place so we used a jack stand and the lift to slowly raise the car and relieve the tension on the coil springs. There are many ways to skin this feline, but just make sure to be careful since there's a ton of stored energy in the compressed spring. Once the spring was gone, we went ahead and removed the stock control arms, sway bar, and worn steering bits.



05 | First to go on, with the supplied Grade 8 hardware, were the new tubular lower control arms. The TIG-welded arms came pre-assembled with new bushings and Moog ball joints. CPP designed the arms so that the same part will work for traditional-style coil springs as well as their coilover shocks. This is a nice feature for those who want to start with springs and upgrade later.

06 | Yeah, they look good, but more importantly, these new TIG-welded tubular upper control arms are considerably stronger than what GM put in the '67 over 40 years ago. The arms are made from 1.25-inch 0.120 wall DOM tubing and have thick 1.5-inch 0.188 wall pivot barrels. This ensures the pivots stay true even under stress. They come preassembled on new billet chromoly 4130 cross-shafts and pivot sleeves. These sleeves capture both sides of the bushing, unlike the stockers that are only retained on one side. As a result, they're much stronger and better resist flex. As a safety measure, they incorporate an interlocking shaft and sleeve design so that the bolts can't work loose. The fact that they came with new ball joints already installed saved us time.



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Reincarnation

07 | Here's the single-adjustable coilover billet shock and 550-lb spring that came in the suspension kit. CPP gets their shocks from QA1, but they are valved to their specifications. Sure, it's nice to be able to adjust ride height, but the real payoff is in being able to dial in the handling with just a turn of a knob.



08 | The new arms attached to the Chevelle frame in the same way that the old ones did. Once the uppers and lowers were in place, we slid the coilover and spring assembly into place and secured it with bushings and a shaft nut up top and two bolts through the crossbar at the bottom of the shock.



09 | Our kit came with A/F/X-Body tall C5 spindles. According to CPP, they have a raised upper ball joint mount for better camber change, and they work with all of their tubular control arms (even stock control arms). They also utilize CPP replacement steering arms. But the two big items are that they work with any brakes designed to fit a C5 spindle (including easy-to-find and dirt-cheap GM C5 take-off brakes) and that they accept 1997-'04 C5 Corvette hub bearing packs. No more packing wheel-bearing grease. They are cast-iron and can be bought separately for just over \$260 a pair.



10 | The kit also came with these C5-style bearing packs (PN 513139, \$80 each). This is a modern sealed bearing that simply bolts to CPP's new C5-style spindles. They don't change the track width at all, and even have the ABS wheel-speed sensors if you want to try going that route.



11 | For cars that are going to be pushed hard (or extremely heavy cars), CPP recommends upgrading to their high-performance SKF hub bearings (PN BR930544, \$858). These are a lot more robust and will better withstand side loading compared to the standard bearing packs. The upgrade cost is \$429.

12 | With the new control arms installed, the rest was crazy easy to do. The main reason for this was that the front spindle, hub, steering arm, and brake parts came completely pre-assembled from CPP. Even the brake pads were installed, so all we had to do was toss on the system between the control arms and secure it in place with castle nuts and cotter pins.



13 | To maximize the gains from our new close-ratio steering box, we also had CPP send over a new steering linkage kit (PN 6467SLK-CP, \$199) along with a pair of their much stronger tie-rod sleeves (PN ES2032SP-A, \$69). The linkage kit included inner and outer tie rods, pitman arm, idler arm, and centerlink.



14 | The replacement box was a CPP 14:1 close-ratio 500 box (PN CP50004, \$379). Having good steering response is critical if you want to improve the handling and feel of an older Chevy, and it's one of the easiest upgrades you can do. The CPP kit came with an aluminum top cover.

15 | The Chevelle suffered from the same vague steering found in all '60's era GM cars. The first step in fixing this was to remove the stock steering box. After disconnecting the rag joint from the steering column, we removed the three bolts that secured the box to the frame. We had to loosen the bumper bracket to gain access to the upper bolt. The new box simply bolted in place of the stocker using the same three frame bolts.





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16 | The headers on our big-block were pretty close to the factory steering shaft so we gained a bit of room by using CPP's Max Clearance nickel-plated power steering shaft (PN CPMAX-KN, \$139), which included a coupler and a new rag joint.

18 | OK, these fell more into the "want" than the "need" category, but they were just too nice not to use. The 2.5-inch aluminum sway bar mounts (PN FBM25-M285, \$69) look great and are stronger than the stamped-steel versions.



17 | Here's the completely assembled left front suspension system. You can also see the new 1.25-inch hollow sway bar that will help the Chevelle stay a bit flatter in the curves.



19 | At some time in its past someone had upgraded the brakes to CPP's master cylinder, and while it worked, we had a better idea. First up was removing the master and brake booster unit.



20 | The Stage-IV kit came with CPP's slick MCPV-1 master cylinder. Besides being all shiny and chrome, the 1-inch bore master had a built-in adjustable proportioning valve. Before installing, we bench-bled it with the kit supplied by CPP.

21 | Hydraulic assist isn't just for large diesel trucks any longer. These systems have long been used in OEM applications where engine vacuum isn't a viable option of brake assist. CPP's new Hydra Stop uses fluid pressure from the power steering system to offer braking assistance. We haven't had much experience with these systems, but after driving their Hydra Stop-equipped test car, we were duly impressed and decided to give it a go.

They come in a chromed-out version dubbed "Show Stopper" and the Street Beast version, which we went with. Ours normally runs \$829 for the assembly, but since we only needed the booster (the MCPV-1 master came with our kit) the up-charge was just \$469.



22 | Since the Hydra Stop uses power steering fluid pressure, we had to rework our power steering hoses. We also added a small Magna Pure filter (red arrow) (PN 20-0038F, \$20) after the Hydra Stop unit to make sure no contaminants would clog the unit. The plumbing was made easier with CPP's stainless hydraulic brake assist hose kit (PN HAHK-S, \$199).



23 | After a long day, we were done with the front of our Chevelle. Next up will be getting the rear system up to date. One thing is for sure; the larger brakes look way better behind the new wheels. Once the full install is completed, we'll test the system to reveal the improvements.

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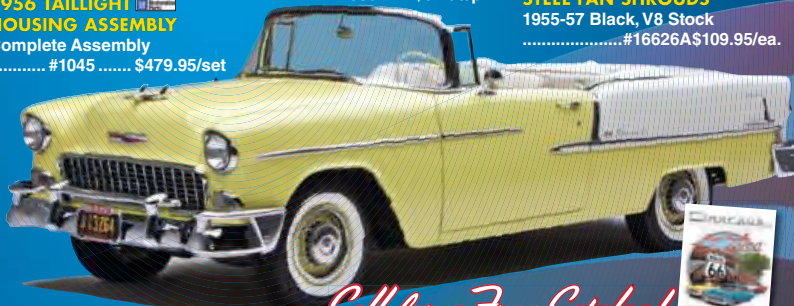


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RIDES

JERI'S R

Once a Hindrance to Drive, Now this 1963 Nova Drop-Top is a Top-Notch Handler with Horsepower to Spare

✦ TEXT: Nick Licata | PHOTOS: Robert McGaffin



➤ **There was a time** when Jeri Campbell liked cruising her 1963 Nova convertible – the one she and her husband, Damion, found a few years back in Kentucky. Jeri especially enjoyed driving down the road with the top down, wind in her hair, and hands lightly influencing the car's course without a worry. Unfortunately, the worry part was ever-present, as the vintage Chevy would oftentimes leave her stranded on the side of the road due to mechanical issues. And on the occasions when the car was in full cooperation, Jeri didn't much care for the temperamental manual brakes and stubborn non-power steering – to the point that she would let the car sit for months. Damion felt the pressure and knew something had to be done so his wife could enjoy driving the car again – in a reliable fashion.



RIDE



An avid enthusiast himself, Damion had his own automotive jones to feed by way of his 1963 Pontiac LeMans and hitting a number of Ultimate Street Car Series events, attending SEMA, and competing in the 2013 Optima Ultimate Street Car Invitational.

In early 2014, Damion's horsepower addiction was finally satisfied (for now, anyway), making time to focus on Jeri's ride and address the manual steering and brake issue. One thing led to another and before long the '63 was completely under the knife. "With the car in pieces, new parts were being delivered daily," recalls Damion. "After a couple of weeks, all new suspension was under the car and the engine mocked up in place. By mid-winter we





had the car running, with just the bodywork needing to be addressed."

Not Damion's first rodeo, he's very familiar with the term, "happy wife, happy life." Jeri's grin widened as the Nova's progress began moving in high gear.

The tired small-block had run its course, and Jeri was ready to move up to something with a little more sauce and a ton more reliability. Damion tracked down a 5.3L LS and had the crew at AMS Racing Engines in West Allis, Wisconsin, machine the block to perfection. Chris Robbin tied in a set of GM LS6 aluminum heads and LS6 cam then assembled the mill with a boost-friendly 9.0:1 compression before greeting the mostly stock bullet with a Turbonetics 72mm turbocharger, set for either 5 or 15 psi of boost. Topline Design & Speed are responsible for the custom-built intercooler and Damion included a TiAL Sport wastegate and blow-off valve. An Aeromotive A1000 fuel pump feeds the thirsty LS and a Derale oil cooler works in cahoots with the AFCO three-row aluminum radiator backed with a single SPAL fan. Holley cast-iron manifolds rapidly evacuate

spent fumes and meet up with a custom 2.5-inch exhaust concluded with pair of DynoMax mufflers.

In a unique division of horsepower output, the drop-top's final tally gets split into two configurations: flip the dash's toggle switch to the "Hers" position and 5 psi of boost garners up an attention-getting 500 hp; "His" ups the boost to 15 psi and unleashes 700 angry ponies that hits like a 36-inch Louisville Slugger.

Jeri prefers to keep life simple, so shifting duties are handed over to a 4L60E automatic transmission worked over by Don Oremus and backed up to a PATC 2,800-stall converter. A narrowed 12-bolt rearend stuffed with Strange 3.55 gears, Mark Williams axles, and a Detroit Truetrac diff capably accept the engine's force, at any boost setting.

With Damion and Jeri's healthy appetite for road course and autocross driving, the stock suspension was replenished with offerings from the aftermarket. TCI Engineering got the nod for their front stub, spindles, and A-arms, while their four-link system handles business out back. Viking adjustable dampers take up residence on all four corners, as



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do Brembo brakes straight off a 2012 Camaro (14-inch rotors, six-piston calipers up front and 14-inch rotors, four-piston calipers out back) hung from custom-made brackets. The stock steering system was tossed aside for a TCI Eng. Mustang II rack.

TSW 18x9 rollers accommodate Nitto NT05 275/35 rubber on all four corners, yet the boxy Chevy's stingy rearward confines fought Damion's every attempt to house the wide rear hides. "We had to cut open and rework the stock wheelhouses a little to make room for the bigger tire," Damion admits.

The topless cockpit evokes a simple theme adorned with a few obvious necessities for track-day driving events. Topline Design & Speed erected a rollbar, which can be removed when just cruising is on the day's agenda, yet a RideTech five-point harness is part of the mix as needed. Damion's handiwork on the interior reflects a stock proposition with the exception of the Dakota Digital VHX dash, Grant steering wheel, B&M shifter, and Kenwood CD player.

Damion, his wife, daughters, and some very good friends pulled together to tackle the bodywork and extensive sanding process. Their tireless efforts contributed to the

TECH CHECK

Owner: Jeri and Damion Campbell
Vehicle: 1963 Nova SS Convertible

Engine

- **Type:** 2001 GM 5.3L LS, Machine work by AMS Racing Engines, Built by Chris Robbin
- **Compression Ratio:** 9.0:1
- **Cylinder Heads:** GM LS6
- **Rotating Assembly:** GM Stock
- **Valvetrain:** GM Stock
- **Camshaft:** COMP LS6
- **Induction:** GM LS2
- **Fuel Delivery:** Aeromotive A1000 fuel pump
- **Ignition:** GM
- **Power-Adder:** Turbonetics 72mm turbo (5 or 15 psi boost)
- **Accessories:** AFCO aluminum radiator, SPAL fan
- **Exhaust:** Holley cast-iron manifolds, custom exhaust, DynoMax mufflers
- **Output:** 500 hp (5 psi boost), 700 hp (15 psi boost)

Drivetrain

- **Transmission:** GM 4L60E overdrive by Don Oremus; PATC 2,800-stall converter
- **Rear Axle:** 12-bolt, Detroit Truetrac, Mark Williams axles, Strange 3.55 gears

Chassis

- **Front Suspension:** TCI Engineering subframe, A-arms, and spindles; Viking springs and adjustable shocks

- **Rear Suspension:** TCI Engineering four-link, Viking springs and adjustable shocks
- **Brakes:** 2012 Camaro Brembo 14-inch rotors, six-piston calipers front; 14-inch rotors, four-piston calipers rear

Wheels & Tires

- **Wheels:** TSW; 18x9 front, 18x9 rear
- **Tires:** Nitto NT05; 275/35 front, 275/35 rear

Interior

- **Upholstery:** Stock
- **Material:** Black vinyl
- **Seats:** 1966 Malibu
- **Dash:** Stock
- **Steering Wheel:** Grant
- **Shifter:** B&M
- **Rollbar:** Custom/removable by Topline Design & Speed
- **Instrumentation:** Dakota Digital
- **Stereo:** Alpine CD
- **Air Conditioning:** top down

Exterior

- **Prep/bodywork:** Family, friends, and Scott Lustig
- **Paint:** PPG Kona Blue by Nagel Auto Body (Scott Lustig)
- **Hood:** Stock
- **Front Splitter:** Aluminum by Topline Design & Speed
- **Bumpers:** Stock

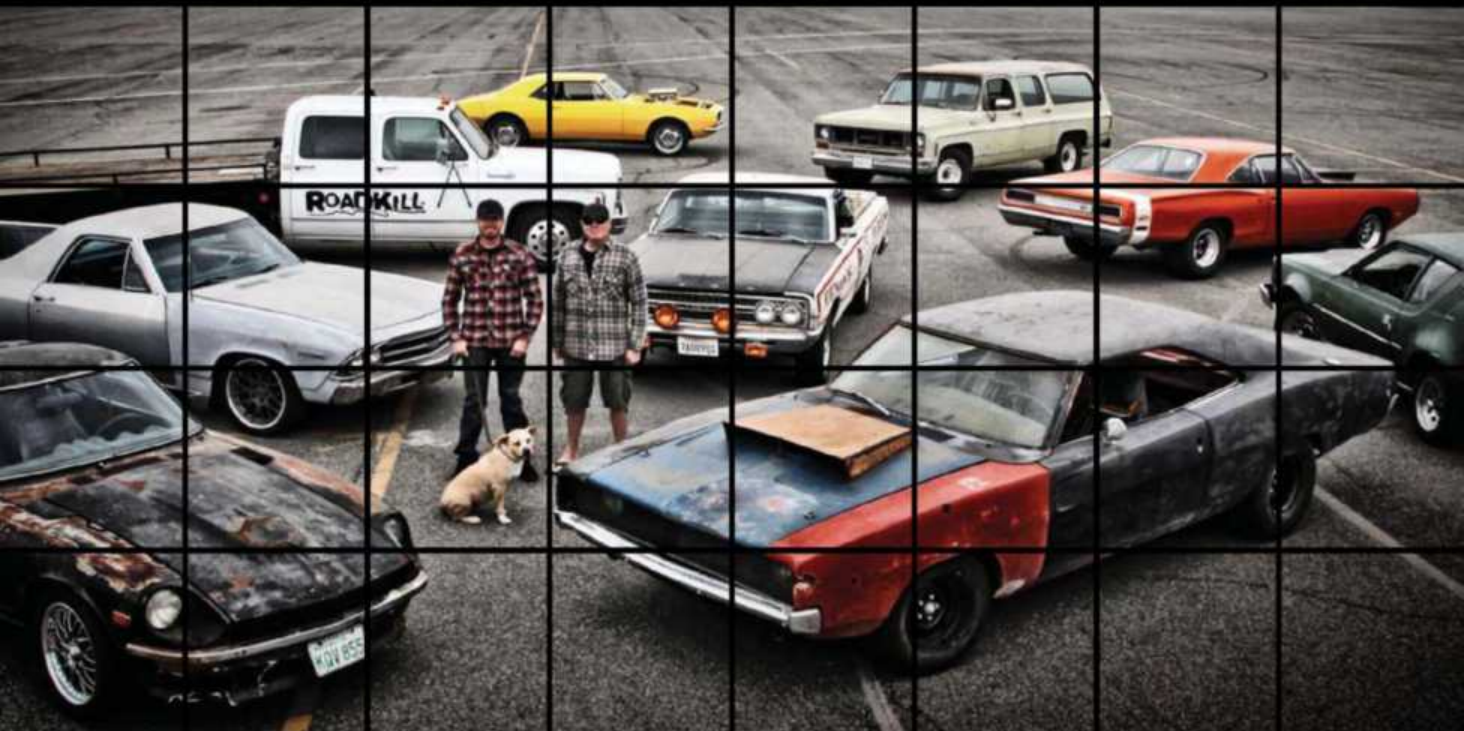
success in bringing the over-50-year-old sheetmetal back to a suitable canvas for Scott Lustig at Nagel Auto Body (Waukesha, Wisconsin) to douse the car in a brilliant sea of PPG Kona Blue. The outcome reflects the aggressive

personality of Jeri's '63 as one of the most unique and quickest drop-top Novas east of the Mississippi.

And as Damion puts it, "now she has power brakes and power steering." **CHP**

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LIMIT 7 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31061193

WOW SUPER COUPON

12 TON SHOP PRESS

GENERAL MACHINERY
• Pair of Arbor Plates Included

SAVE \$100

LOT 33497/60604 shown

\$99⁹⁹ REG. PRICE \$199.99

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31067202

WOW SUPER COUPON

10 FT. x 20 FT. PORTABLE CAR CANOPY

LOT 60728
69034 shown

SAVE OVER \$90

\$109⁹⁹ REG. PRICE \$199.99

LIMIT 3 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31022203

WOW SUPER COUPON

5 PIECE PLIERS SET

LOT 69352/62823/69351 shown
69353/62597/62598

SAVE 55%

\$8⁹⁹ REG. PRICE \$19.99

LIMIT 9 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31038735

WOW SUPER COUPON

MECHANIC'S SHOP TOWELS

PACK OF 50

LOT 46163 shown
68442/69649
61878/61837

SAVE 50%

\$7⁹⁹ REG. PRICE \$19.99

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31048144

WOW SUPER COUPON

4-1/2" ANGLE GRINDER

drillmaster

LOT 60625 shown
95578/69645

SAVE 50%

\$9⁹⁹ REG. PRICE \$19.99

LIMIT 7 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31056101

WOW SUPER COUPON

PITTSBURGH 2000 LB. FOLDABLE ENGINE STAND

LOT 69522 shown
69521/67015

SAVE \$50

\$109⁹⁹ REG. PRICE \$159.99

LIMIT 5 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31059837

WOW SUPER COUPON

110 LB. PRESSURIZED ABRASIVE BLASTER

LOT 68724/95014
60696 shown

SAVE \$150

\$99⁹⁹ REG. PRICE \$249.99

LIMIT 3 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31060448

WOW SUPER COUPON

NEW

20 OZ. PROFESSIONAL HVLP GRAVITY FEED AIR SPRAY GUN (600 CC)

LOT 68843

SAVE 40%

\$47⁹⁹ REG. PRICE \$79.99

LIMIT 7 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31023727

WOW SUPER COUPON

RETRACTABLE AIR HOSE REEL WITH 3/8" x 50 FT. HOSE

LOT 93897 shown
69265/62344

SAVE \$90

\$59⁹⁹ REG. PRICE \$149.99

LIMIT 4 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31034337

WOW SUPER COUPON

PITTSBURGH 1000 LB. CAPACITY MOTORCYCLE LIFT

• Height Range: 7" - 30"

LOT 69904
68892 shown

SAVE \$400

\$299⁹⁹ REG. PRICE \$699.99

LIMIT 5 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

31046890

WOW SUPER COUPON

CENTECH AUTOMATIC BATTERY FLOAT CHARGER

LOT 42292 shown
69594/69955

SAVE 70%

\$5⁹⁹ REG. PRICE \$19.99

LIMIT 6 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 12/28/15. Limit one coupon per customer per day.

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CAMARO PRODUCT SHOWCASE

Let's face it, the Chevrolet Camaro is the hottest and most recognizable American muscle car in the world, and with the recent release of the newly designed sixth-gen version, the car's popularity will no doubt continue to thrive. Not only will the 2016 Camaro raise eyebrows with its epic performance and style, but its earlier generation predecessors will also remain the pinnacle of muscle car royalty. That's great news for Camaro owners of all genres. Whether you fancy straight-line performing drag cars, Pro



Touring handling rides, or just want to jazz up the style and appearance of your Camaro, you'll be sure to find something within the *Chevy High Performance* eight-page Camaro Product Showcase to keep your car running and looking great.



For every 1982-'92 F-body LSx conversion, Hawks Third Generation provides the necessities in a ready-

to-install kit. With this kit, you will be ready to start your own LSx conversion in your third-gen Camaro or



Firebird. The parts in the kit include: engine motor mount pads, transmission crossmember for 4L60E automatic or T56 six-speed, A/C compressor notch plate kit, fuel pump kit, fuel line kit, fuel pressure regulator and gauge, throttle cable kit, A/C line kit, and Hawks polished stainless long-tube headers and aluminized steel Y-pipe. Call them today or check out their website for more information.

Hawks Third Generation, LLC
864.855.2694
www.hawksthirdgenparts.com

Hawks Third Generation has been on the forefront of reproduction parts for the 1982-'92 Camaro and Firebird market.

Just released this year are the Dual Fan Upper & Lower Mounting Brackets for the 1987-'92 Camaro and Firebirds that came equipped from the factory with a dual fan setup. Over time, the original setup could have easily been broken from age and normal wear



and tear, but now you can replace these brackets with factory-style brackets. Check them out online with the following part numbers: HT10069174 for the upper and HT10055083 for the lower.

Hawks Third Generation, LLC
864.855.2694
www.hawksthirdgenparts.com



cams and more, they also sell and install almost all quality aftermarket brands. Mail order tuning by bench flashing or HP Tuners is also offered. Looking to upgrade your Camaro or other LS-based vehicle? They handle everything from mild to wild, specializing in complete turnkey builds. Follow them on Facebook to keep up with their latest products and shop builds.

PCM of NC, Inc
704.307.4227
www.pcmofnc.com

PCM of NC is constantly releasing new products for most late-model GM platforms, specializing in LSx performance. In addition to

unique, high-quality parts such as their 6L80E to 4L80E transmission conversion harnesses, catch can kits, transmission cooler kits, custom



KENNE BELL

With factory engines being increasingly efficient and emissions testing limiting some of the bolt-on products, 50-state-legal supercharger kits have become very popular as big horsepower adders. The OEM's agree as they are also switching to forced induction. A 200hp increase on pump 93 octane is easy with only a 2.8 Kenne Bell Twin Screw Supercharger Kit. A big step up from a little 2.3 front inlet. More hp

than all the bolt-ons combined. Their proven "rear inlet" design features a huge 4.5-inch Mammoth inlet system and a real cool-air kit with the filter mounted under the front valance in

cool, dense air. 1,400hp-rated Ultra Hi-Density intercooler and big dual-pass heat exchanger. Larger 3.2, 3.6, and 4.2 kits are available for higher hp/boost applications (up to 1,800hp) in polished or black. Patented Liquid Cooling optional. All kits are Kenne Bell factory tuned so re-tuning is unnecessary.

Kenne Bell
909.941.6646
www.kennebell.net



Prothane offers a Total (full replacement) Bushing Kit for the 2010-'14 Camaro. This kit (PN 7-2044) comes complete with subframe bushings and replaces OEM rubber parts. It includes bushings and components for front control arms, steering rack, front and rear sway

bars, rear control arms, adjustment link, trailing arm, and rear differential. Factory rubber parts exhibit excessive play resulting in poor handling. OEM rubber tends to deteriorate and rot. The Prothane Total Kit features specially engineered polyurethane bushings and components designed

to provide improved handling and a more stable and controllable ride. Prothane components are impervious to oil and grease, which outlast stock rubber bushings. They are precision fit replacements, with no hassles or special tools required. Prothane also offers suspension bushing kits, motor/transmission mounts, chassis mounts, bumpstops and driveline couplers.

Prothane
888.PROTHANE
www.prothane.com



with GM. Their radios feature large OEM-style pushbuttons, vintage-styled knobs, and upgraded



Custom Autosound is proud to present the next evolution of their USA-630 II, their most popular replacement radio for Camaros. The manufacturer states that this is the only replacement radio made to fit your stock dash right out of the box. Since 1977, Custom Autosound has continued to upgrade its products to meet the demands of new technology while maintaining the classic look of your vehicle's interior. Custom Autosound is an official licensee

display that appears analog until turned on, then displays in negative LCD! Other features include:

- iPod dock
- USB port for Flash memory MP3/WMA playback
- 300 watts peak power
- Negative LCD display with RDS (shows station/song/artist)
- Bluetooth compatible (PN BLUKIT, sold separately)
- Direct CD control for 6-Disc Changer or new Single CD slave unit

- 4-channel RCA pre-outs
- 2-channel RCA auxiliary input for Satellite
- AM/FM with 16 presets (12 FM/4 AM)
- Digital EQ, 4-way fader, balance, separate bass, and treble
- Power antenna lead
- USA/Euro tuner

Custom Autosound
800.888.8637

www.customautosound.com



Real Deal Steel assembles all-new steel 1967-'69 Camaro coupe bodies at their plant in Sanford, Florida. All bodies are assembled on a rotating body platform using precise in-car fixtures for exact internal structure and panel fit. All exterior body panels are GM Licensed 18-gauge steel from Auto Metal Direct (AMD). Assembly is

completed using 220V water-cooled resistance spot welders, just like the original GM plant used. Each and every body is painstakingly test-fitted to be certain that all panels fit properly to reduce fitment and bodywork time for the end user. Bodies are available with factory A/C, stock heater, or heater-delete firewalls; with mini-tubs



already installed; and as standard or RS models. Real Deal also offers Camaro body skeletons without skins for the DIY'er, as well as a full line of reproduction body panels. Real Deal's Camaro bodies are fully licensed by General Motors. Real Deal plans to introduce first-generation Camaro convertible bodies sometime in 2016.

Real Deal Steel
407.585.1957
www.realdealsteel.com



Flaming River power rack-and-pinion systems have over 6 inches of travel and provide a full lock-to-lock turning radius. The Flaming River power rack-and-pinion is a completely new unit, it allows for an adjustable pinion angle, there is no core charge required and is made in the USA.

The system installs using the original mounting holes for the steering box and idler arm assembly. The system does not require any cutting, drilling, or welding and installs using basic hand tools. Kits are available for 1967-'69 and 1970-'81 Camaros.

Flaming River also offers



small-block Chevy headers. These Ultra Angle Headers have been specifically designed to leave room for the steering shaft and universal joints when installing a rack-and-pinion system. The Ultra Angle Headers are available uncoated (PN FR50001) and coated (PN FR50001C).

Flaming River
800.648.8022
www.flamingriver.com



MuscleRods offers everything you need to put an LS-based engine into your first-, second-, or third-generation F-body. The MuscleRods mount and crossmember kit includes engine mounts and frame brackets that bolt into existing holes in the subframe for an easy install. The

first- and second-gen kits include their Sure-Fit crossmember system, which allows you to run any transmission, including the 4L80E and the new six-speed manual and automatics.

Polyurethane is used for the engine and transmission mounting and the kit comes with all necessary hardware. These kits were designed on real project cars to give you the best placement for new or existing components. This placement allows the most options for front accessory drives and provides clearance for the factory A/C box, power brake booster, and aftermarket



MUSCLERODS.COM

suspension components. This engine position also ensures no steering interference and proper driveline angle for smooth highway cruising. Also offered is a multitude of header options to match to your horsepower level.

MuscleRods
770.751.0687
www.musclerods.com



MuscleRods now offers LS conversion radiators specifically built for the first- or second-generation F-body. MuscleRods conversion radiators are drop-in designed and include all of the added features

needed for a clean LS engine swap. They feature all-aluminum construction and have beautifully stamped tanks with strengthening indentations just like your original. They mount in place like the factory unit

and, if ordered in the optional black epoxy finish, look like original equipment. They're a double-pass design putting the inlet and outlet on the same side, greatly simplifying plumbing to the engine. The all-important steam port bung is welded into the upper part of the tank, which



MUSCLERODS.COM

lets your new LS engine vent properly. They also include a coolant temp fan switch in the tank, as well as a billet radiator cap. The radiators are an excellent restoration type quality and are made in the USA. Available in bare aluminum or black.

MuscleRods
770.751.0687
www.musclerods.com



Fifth-gen Camaros come in three high-tech flavors (LS3, L99, and LSA), but there's only one flavor of scanning/tuning software that delivers maximum performance: the FlashScan V2 from EFILive. FlashScan V2 allows you to monitor data, log ECM and TCM activity, check and reset diagnostic trouble codes, and custom-program engine and transmission controllers. FlashScan's integrated scanning and tuning software simplifies tuning with its overlay capabilities. Simply highlight an area in a data log created by the scanning program, and the cells containing the values



that control the conditions being monitored are highlighted in the tuning program. FlashScan V2 controller allows "black box" scanning, tuning, and trouble code reset without using a PC. You can find out more about FlashScan V2 and even download a free copy of the software from their website.

EFILive
www.efilive.com



AutoRad can build the complete cooling package for your 1967-'81 Camaro project. Besides the radiator/core support units, AutoRad also builds matching intercoolers, oil coolers, and tranny coolers. They

make units for LS, big-block Chevy, and small-block Chevy engines. They even have the capability to make radiators for engines making over 900 horsepower.

AutoRad LLC
770.983.1345
www.autoradradiators.com

Looking to update the wheels on your classic Chevy but prefer the OEM styling? YearOne can help with their impressive lineup of upgraded wheels based on the iconic designs of the supercar era — like the classic five-spoke Chevy wheel.

YearOne has upgraded the originals by making them in aluminum (the originals were stamped steel) in modern 17-inch diameters with 8- or 9-inch widths. The wheels feature a gunmetal gray powdercoated center with a brushed outer lip that replaces the OEM trim ring. The five-spoke wheels



YEARONE
Muscle Car Parts

accept original center caps and lug nuts for easy installation and an authentic look.

YearOne 17-inch, five-spoke wheels are available individually, in sets of four, or complete kits including center caps and lug nuts. For a limited time, complete wheel kits ship free in the continental U.S.

YearOne
800.YEARONE
www.yearone.com

It's a crate engine world these days — and with the type of affordable PowerCrate 350 powerhouses available from YearOne it's easy to see why. Using premium components such as Edelbrock or Dart heads, hydraulic roller camshafts, and one-piece rear main seals, YearOne PowerCrate engines make 400+ horsepower with streetable compression ratios and with plenty of vacuum for power accessories. Each engine is complete less carburetor, distributor, water pump and exhaust, and ships with a dyno sheet showing exactly how much power that example made.

And for a limited time — all YearOne



PowerCrate 350 engines feature free standard shipping in the continental U.S. AT350PC1. PowerCrate 350 with Edelbrock aluminum heads

YEARONE
Muscle Car Parts

— 24-month/24k warranty. \$3,699
CT350PC1. PowerCrate 350 with Dart iron heads — 12-month/12k warranty. \$3,199

YearOne
800.YEARONE
www.yearone.com



Are you ready to put an LS engine into your classic? Classic Performance Products introduces their new FitRite LS Engine Adapter Bracket Kits to help with your project. CPP's long adapter kit allows the engine to move from 1/2-inch rearward (great for oil pan-to-crossmember clearance) up to 3-inches forward for a full 3-1/2 inches of travel with a completely custom range of positions. CPP's exclusive



short adapter kit is a smaller, more compact version, moving the engine from 2-1/4 inches forward to 3-3/4 inches forward for a total of 1-1/2 inches of travel. CPP's exclusive design no-weld brackets are CNC laser cut steel and feature a durable black powdercoat finish. FitRite kits include Polyplus engine mounts. Kits start at \$129.

Classic Performance Products
800.830.7657
www.classicperform.com

These spindles from Classic Performance Products are a direct bolt-on for 1967-'81 Camaros (early Camaro kit uses original or CPP replacement steering arms) and utilize a C5 bearing hub assembly. By utilizing a sealed bearing pack, factory spindle pin flex, which causes caliper piston push-back, is eliminated. This condition is especially problematic on aftermarket multi-piston, radial-mount-style calipers. They also utilize C5 brakes or aftermarket alternatives (a direct fit for Baer, Brembo, and Wilwood C5 applications). The early A/F/X-body tall spindle helps with



improved geometry by giving a better camber change during suspension movement and also maintains the drum brake offset. The second-generation Camaro spindle is the



first of its kind, and exclusive to CPP. Complete brake kits include spindles, slotted and drilled rotors, loaded calipers, sealed bearing packs, and mounting hardware. These kits use a 13-inch rotor and require a minimum 17-inch wheel. These kits are available with black or red calipers. Kits start at \$649.

Classic Performance Products
800.830.7657
www.classicperform.com



Classic Performance Products now offers a Hydra Stop Hydraulic Assist System, a high-quality, direct bolt-in hydraulic brake booster kit designed to upgrade manual or vacuum-assisted brakes with a powerful and compact modern hydraulic assist unit, for 1967-'81 Camaros. Kits consist of a direct-fit, high-performance hydraulic brake assist unit; braided stainless or rubber high-pressure line set; heavy-duty power steering

return line; pedal rod hardware; and mounting hardware. Using all-new parts, this unit puts out an amazing 1,800 psi at the wheels. The Show Stopper package includes the Hydraulic Brake Assist unit with billet aluminum firewall mounting bracket, #MCPV1 master cylinder, chrome accumulator cover, stainless pressure hoses, rubber return hoses, and all necessary fittings and hardware. The Street Beast package includes the Hydraulic Brake Assist Unit with steel firewall mounting bracket, aluminum

return line; pedal rod hardware; and mounting hardware. Using all-new parts, this unit puts out an amazing



Corvette-style master cylinder, side mounted Prop & Stop Block kit, rubber pressure and return hoses, and all necessary fittings and hardware. Bare units are Hydraulic Assist only, master cylinder and hoses are not included. Prices for bare units start at \$469 and complete kits start at \$829.

Classic Performance Products
800.830.7657
www.classicperform.com



Phastek Performance is a leading Camaro aftermarket authority with their online Camaro superstore that has everything you need for your 2010-'15 Camaro, as well as the new 2016+ Camaro. The Phastek

Team has hands-on experience with the Camaro at their Houston facility with in-house dyno testing and professional installations, and 1,000's of custom Camaro upgrades available on their website. Performance, style,

PHASTEK PERFORMANCE

and lighting – shop cold-air intakes, headers and exhausts, custom tuning, engine and drivetrain upgrades, suspension upgrades, wheel and brake upgrades, as well as exterior styling and lighting upgrades, and it's all available online. Order online, by phone, via live chat, or in-store.

Phastek Performance
855.PHASTEK (742.7835)
www.phastekperformance.com



Tanks Inc. is proud to announce their latest EFI Camaro gas tank. This notched corner 1967-'69 Camaro and Firebird EFI gas tank is perfect for mini-tub applications. The front of this tank is narrowed to 27 inches to clear up to a 345 tire and 3-inch exhaust.

To help regain fuel capacity from the notched corners, this tank is 1-inch deeper than stock. Even if you do not have a mini-tubbed car this tank will work on a stock car where you need a little more clearance for exhaust. These powdercoated, stock-looking



tanks have all the internal baffling late-model engines require to prevent fuel pump starvation. Even if you have a carbureted car this tank will make a great upgrade. Tanks Inc. now has EFI gas tanks for 1967-'81 Camaros and more tanks are being developed all of the time. So be sure to check their website for your application.

Tanks Inc.
877.596.3842
www.tanksinc.com



Camaro owners seeking to enhance their engine compartments have many options, thanks to the underhood experts at Undercover Innovations. The company's unique hood latch show panels look great

and they also serve to better control airflow and reduce operating temperatures. They're available in natural, polished, and black-anodized aluminum finishes, and can be custom engraved — including over a dozen popular logos officially licensed from GM.

Undercover Innovations also manufactures several other products to improve cooling and underhood appearance, including firewall covers, lower closeouts, and radiator covers.



Custom engraving is the company's specialty, and extends to a variety of other items, including valve covers, air cleaners, door sills, and more. These, and a variety of other billet aluminum products for Camaros and other applications are available online.

Undercover Innovations
888.866.4114
www.undercoverinnovations.com



Global West offers extended travel coilover kits for 1967-'81 Camaros. This addresses the problem of bottoming out with really low vehicles. The kits extended the shock mount

on the frame and on the lower control arm. This increases the shock length that allows for additional travel with lowered ride heights. The springs also convert over to a common 2-1/2-inch



id spring, giving you more spring rate selections. The components can be purchased several ways; however, for best results purchasing the upper and lower arms with the frame mount kit are ideal. Springs and shocks are options depending on the brand of shock or spring rate required. All these components use stock frames.

Global West Suspensions
877.470.2975
www.globalwest.net



Replace your Camaro's factory dash, with its chintzy gauges and idiot lights, with a high-performance setup from Classic Dash. The UV-resistant, molded ABS composite panels come in black matte, brushed aluminum, and carbon-fiber finishes and will precisely bolt in place of the OEM unit. Available for all first-, second-, and third-generation Camaros. Choose



between a wide variety of Auto Meter and Thunder Road gauges to get the look you want and the ability to keep close tabs on your ride. Installation can easily be done by a competent do-it-yourselfer using commonly available tools. Complete wiring harnesses and fully illustrated instruction booklets are available.

Classic Dash
775.883.7904
www.classicdash.com



Mast Motorsports is offering an LS3 Stage III Track Package. The kit includes:

- LS3 single-bolt cam for manual transmission Camaros
- Mast premium valvesprings
- Mast Black Label LS3 255 cylinder heads
- Mast 8.150-inch long, 3/8-inch pushrod
- Mast stainless steel intake and exhaust valves, retainers, and locks



Cam Specs:

Duration @ 0.050: 230/244 degrees
Lift: 0.588/0.607 inch
LSA: 111 degrees

The cylinder heads are fully assembled, and when coupled with headers can produce a 125hp gain at the rear wheels. This cam has an aggressive idle.

Mast Motorsports
936.560.2218
www.mastmotorsports.com

DOUBLE TROUBLE

20 psi Positive Manifold Pressure ...
With a 150-Shot Back

♦ TEXT: **Ro McGonegal** | PHOTOS: **Grant Cox**





RIDES

➔ **Wretched excess** is not a new idea. People have been ascribing to it since the first tires ever smoked macadam. And of course they still do, now under the tremendous crush and immediacy of the social networks and that whole crazy YouTube business compounded by the deleterious infection of mind-numbing advertising drivel. Man, you better get your priorities straight. Now. Better get a long leg up on everybody else because that's what they're trying to do to you.

Billy Schwerin isn't bashful. He went right for the blue sky with a double tap on the power side ... the power of the turbocharger seems nearly unlimited, but the notion is even cheerier when there's a nitrous oxide qualifier looming large behind it.





The 23-year-old Billy relates his expensive hobby. “I’ve had several F-bodies and Z06 Corvettes, but this [Camaro] is by far the fastest and the most favorite I’ve owned.” Billy’s been known to step out smartly. He spotted the lamb on ls1tech.com, shivered a little, and traded his LSX454-puffed 2010 SS for it straightaway.

He gathered his friends and confidants immediately and immersed them. Billy thanks the car’s original owner and builder Justin Keith for his after-purchase help. At the top of the chart, his fiancé, Michelle; then his dad, Bill; and younger brother Blake, along with Kiley Reynolds, Jacob Wright, Chris Brewer, Jim Parkison, Nick Blasingame, Nick Smith, Troy Emberton, Jeff Speer, John Wilson, and Carey Pepper. On the backside, there’s his tuner Justin Kalwei and the irrepressible Aaron Shoaf at Texas Speed.

The car was in fine shape, paint and sheetmetal pristine, but that really was not an issue because Billy was going to race the thing. He forsook form when the priority was function so he saved a chunk of time and money there. The car was low mileage, just 64K on it right now, so all the changes have been to its constitution. Why the juice on top of the turbo? You don’t carry a switchblade to a gunfight. You bring two guns instead.

Billy’s big one was a 408-inch LQ9 built by Aaron Shoaf at Texas Speed to host a bunch of boost. The basis was a beefy amalgam of high-end components (Callies crank and rods and custom Wiseco pistons), and the aluminum cylinder case was carved and fortified to meet the onslaught. On the other hand, the LSA cylinder heads from the 6.2L supercharged engine have not been altered and use the rocker arms from





9TH ANNUAL OKTOBERFEST



ALL GM SHOW

OCTOBER 3RD, 2015



Silver Springs

silversprings.com
www.floridastateparks.org
 5656 E. Silver Springs Blvd.
 Silver Springs, Florida 34488

State Park

ALL PREREGISTERED VEHICLES
 MODEL-YEAR 1989-EARLIER PARTICIPATE FOR **FREE!**

All vehicles model-year 1990-newer pay a modest park-fee of \$10/car, with no charges for additional passes. All show proceeds go **100% DIRECTLY** towards supporting Silver Springs.

No judges, no tech, no "leave your top and windows up!", no broiling on blacktop in a mall parking lot with nothing to do... October 3rd, 2015. Spend a relaxing day in a natural garden setting to visit with fellow hobbyists and friends. Whether your GM-powered car/or truck is classic or modern, stock or modified, you are welcome to join us! NPD suppliers will be on hand showcasing their wonderful products. You must enter a GM-powered vehicle to receive the show package/benefits.

The show is Totally Free to 1989-earlier vehicles, however registration must be turned in by September 25th, 2015 or you will be subject to the \$10 fee!

This is a just for fun event! Judging is people's choice. Ballots due by 3:00pm and awards presented at 4:00pm; you must be present at award ceremony to receive your award. Please join us, cars will be allowed to leave immediately following awards presentation.

The show also incorporates an All-GM cruise to Cedar Key from NPD's main warehouse 900 S.W. 38th Ave, Ocala on Friday morning October 2nd. Participants are welcome to tour/browse NPD's extensive private car and truck collection starting at 8 A.M. before a short driver's meeting at 9:45 A.M., then the cruise departs. For more information, visit our website at www.npdlink.com

npdlink.com/store/pages/ss_gm.html and click the "All GM Cruise" button. You can also contact Derek Putnam for more information by phone or e-mail (contact information listed below).

PLEASE NOTE: If you're planning to attend the event, but will not be participating/registering, you may enter the park for \$8/vehicle (up to 8 passengers), \$5/single-occupant-vehicle, or \$2.00 walk-or-bicycle in.

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Double Trouble

an LS3 – another wise, cost-conscious move. Time and again, the OE assemblies have proven foolproof. Along that same line, it doesn't make sense to incorporate trick parts when the original stuff will do just fine.

When Collin Williams finessed the Road Pirate turbo kit, instead of having to fabricate a header system, he used truck exhaust manifolds as the starting point. Companion to the cast-iron branches, the hot-side pipe has a 2.5-inch diameter; the cold-side tube is 3-inch and the downpipe is 4-inches fat.

To facilitate the pressurized charge as well as the wet nitrous oxide system, Aaron liked the Holley Hi-Ram intake manifold. He stuck an NX 102mm plate in its mouth and flanked it with the companion fuel rails and the solenoids for gasoline and nitrous. He usually runs a #50 nitrous jet and 2,000cc injectors. Fuel pressure is 55-60 psi. All is preceded by a 4-inch thick Active Autowerke intercooler core. The turbocharger is a 91mm Turbonetics piece, and fuel and enrichment is metered by a MagnaFuel 750 pump and an Aeromotive regulator. Nick Williams jazzed the 102mm throttle body. They got the engine running ragged and took it to Jim Parkison's JP Tuning in freeway-close Van Buren, Arkansas, for the final laying on of hands.



Putting almost 1,000 horsepower and nearly as much grunt to the pavement in a unibody ain't that easy, but Midwest Chassis in North Pekin, Illinois, (an undershirt of Peoria) gathered the right stuff and plastered it home. After sizing the UMI tubular K-member, Midwest installed the UMI upper and lower control arms, the QA1 coilovers, their own torque arm, and the BMR Panhard rod. The rear of the Camaro rides on QA1 coilovers, and the Midwest 9-inch axle is located by Midwest upper and lower links.

One of the things that Billy likes best about his little buddy is its stance, not an easy thing to pull off when you're running skinnies that are a good bit taller than the Hoosiers on the back.



It's a trick of light and of perception. The wheel treatment is instrumental in reducing this visual disparity and the ride height is easily controlled with the adjustable shock absorbers. In fact, the

wheels are actually what "drives" this rendition.

Young Bill is a fan of the 1,000-foot dragstrip and his Camaro has run 8-flat at 138 (with a 1.8-second 60-foot time) on that venue. He wants to compete in EFI Pro and expects 6.90s – maybe not with the current contraption, though. He's already collecting pieces for the new LSX engine he's coveting and hopes to run the Texas Invitational sometime soon. Better bring both gats anyway, Billy, put Fort Smith, Arkansas, on the map. **CHP**

TECH CHECK

Owner: Billy Schwerin,
Fort Smith, Arkansas
Vehicle: 2002 Camaro Z28

Engine

- Type:** LQ9 cylinder block
- Displacement:** 408 ci
- Compression Ratio:** 10.4:1
- Bore:** 4.03 inches
- Stroke:** 4.00 inches
- Cylinder Heads:** Stock-port LSA, 15-degree valve angle, 2.16/1.59 valves
- Rotating Assembly:** Callies DragonSlayer crankshaft and I-beam rods, Wiseco pistons w/ upgraded wristpins
- Valvetrain:** COMP Cams hydraulic roller lifters, LS3 rocker arms, 1.7:1 ratio
- Camshaft:** COMP Cams 0.622/0.624-inch lift; 237/243-degree duration at 0.050
- Induction:** Holley Hi-Ram manifold, Nick Williams 102mm throttle body, Road Pirate turbo kit (finessed by Collin Williams), single Turbonetics 91mm/T6 housing, 3-bar MAP, ProCharger Big Red blow-off valve, Turbonetics wastegate, 34x4-inch intercooler core, MagnaFuel 750 fuel pump in conjunction with Holley EFI pump, Aeromotive regulator; Nitrous Express wet system w/ 102mm plate
- Ignition:** OE type (tuned by Jim Parkison, Van Buren, Arkansas), NGK BR7EF spark plugs
- Exhaust:** Truck exhaust manifolds, 3-inch system
- Built by:** Texas Speed, Lubbock, Texas; machine work by Steve's Custom Machine, Alma, Arkansas
- Output (at the wheels):** 976 hp at 5,800 rpm, 900 lb-ft at 3,800 rpm (20 psi positive manifold pressure)

Drivetrain

- Transmission:** Turbo 400, PTC race torque converter, 3,500-stall speed, transbrake, B&M fluid cooler
- Rear Axle:** Midwest Chassis (North Pekin, Illinois) fabricated 9-inch, 3.23:1 ratio, Moser 35-spline axles

Chassis

- Steering:** Manual rack-and-pinion
- Front Suspension:** UMI Performance tubular K-member and control arms, QA1 coilover shock absorbers, six-point rollbar
- Rear Suspension:** Midwest Chassis lower links and torque arm, BMR Panhard rod, custom subframe connectors, QA1 coilover shock absorbers
- Brakes:** 2010 Camaro Brembo 14.0-inch discs with four-piston calipers front; Strange Engineering 12.19-inch discs with four-piston calipers rear

Wheels & Tires

- Wheels:** Weld RT-S 17x5 front, 15x10 Champion Beadlocks rear
- Tires:** M&H Racemaster Front Runner 4.5/28.7 front, Hoosier Quick Time DOT 275/50 rear

Interior

- Seats:** Corbeau CR1 w/ harness
- Audio:** None
- Upholstery:** Leather
- Gauges:** AEM boost and wide-band, Auto Meter fuel pressure
- Steering Wheel:** OE
- Carpet:** OE
- Shifter:** Hurst Quarter Stick

Exterior

- Body Prep/Paint:** OE Light Pewter Metallic (Code 11)
- Hood:** Sunoco cowl
- Spoiler:** OE Super Sport

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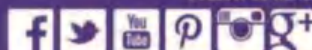
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THE ROUNDABOUT

Holley's New LS Engine Accessory Drive System

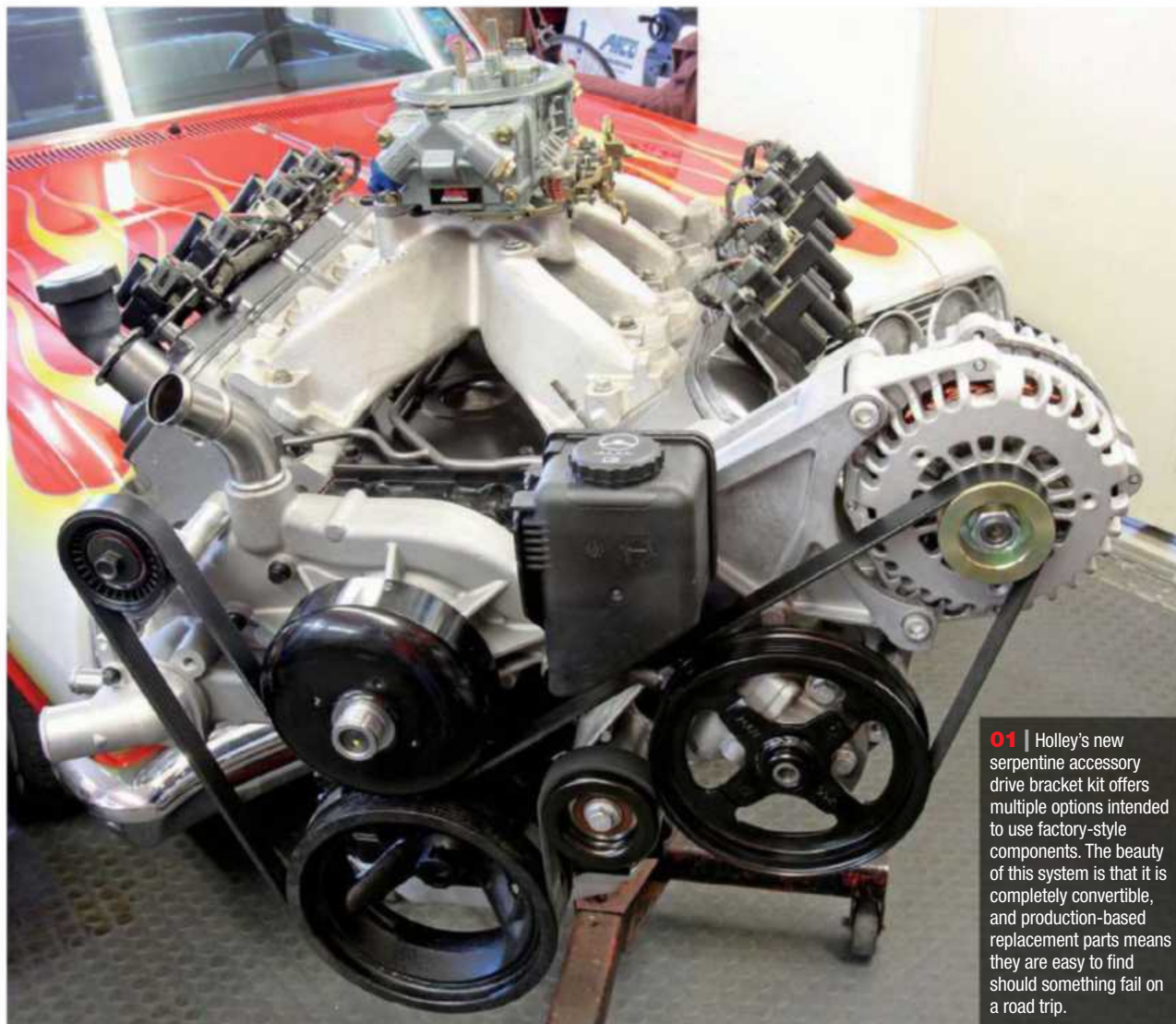
♦ TEXT & PHOTOS: **Jeff Smith**

It's astonishing to realize that by 2017, the LS engine will be 20 years old. This coming of age has also delivered an avalanche of new parts. Engine swaps have become a critical reason for the success of this engine, and among the many variables required to complete a successful engine swap is the accessory drive. In the early days of LS engine conversions into older muscle cars, the only option was the factory systems. But that's changing now.

LS enthusiasts know the drill – there are three basic factory systems based on harmonic balancer length. The Corvette system is the shallowest, using the shortest balancer. The middle length is based on the early Gen III Camaro systems (among others) with a balancer depth slightly longer than the Corvette.

The third, and most common, system is the truck-based accessory drive with its tallest harmonic balancer. There are other variations within these three family trees, but in simplified terms, this is how it all shakes out.

Typically, the most sought-after accessory drive is the Corvette version, but not just because it is the shallowest – allowing the most room



01 | Holley's new serpentine accessory drive bracket kit offers multiple options intended to use factory-style components. The beauty of this system is that it is completely convertible, and production-based replacement parts means they are easy to find should something fail on a road trip.

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02 | The Holley bracket kit uses the Corvette balancer for the base kit, employing spacers to accommodate longer F-car or truck engine balancers. This way, you can have a Corvette-like accessory drive without purchasing a new balancer. This is the bracket kit that mounts the alternator and power steering pump. The castings are extremely nice. If you wanted to give the package a different look, it would be easy to powdercoat the brackets.



03 | The first step is to determine the balancer depth. Take the measurement from the forward face of the pulley to the crank bolt flange surface. In our case, this truck balancer measured 3 inches. The F-car depth is 2.25 inches while the Corvette balancer is only 1.5 inches.

to the front of the engine. The Vette drive also offers a narrow layout of the alternator and power steering pump, with the alternator perched above the pump. The Camaro/GTO orientation places the power steering pump above the alternator, making this configuration nearly as desirable as the Corvette layout. The final is the truck configuration with a decidedly vertical orientation that is the narrowest but much taller. The 2010 Camaro LS3/L99 system also uses the deep balancer but with a different orientation, with the alternator located low on the left side.

The challenge for engine swappers is that the most desirous accessory drives are also the most expensive. This leaves the truck drives that many enthusiasts consider either too clunky or too tall to clear a low hood line. Here's where Holley offers an excellent alternative. Let's say that you have invested in a nice 6.0L truck engine, but you've dumped the stock truck accessory drive in favor of something more compact. The aftermarket is replete with expensive polished systems, but most of these command prices well north of \$2,000 for a complete system that often use unique components not easily replaced at the local auto parts store.

Holley's plan was to build a factory-like system but make it adaptable. Holley's basic bracket kit can accommodate all three balancer configurations with the simple addition of spacers. Holley bases its system on the Corvette balancer. With an engine using an F-car or the truck engine balancer, the only requirement is the appropriate spacer. It's a really simple solution that eliminates purchasing an expensive balancer.

APPLICATION GUIDE

This chart lists the specific applications for the part numbers listed on the far left.

PN	Brackets	A/C Notes	Harmonic Balancer Length		
			Std. Short (e.g., Corvette)	Middle (e.g., F-body/GTO)	Long (e.g., truck, '10-up Camaro)
20-131*	Dr. & Pass side Alt., P/S, A/C	R4 Compressor	21-1	21-2	21-3
20-132*	Dr. & Pass side Alt., P/S, A/C	Sanden SD508 or SD7	21-1	21-2	21-3
20-133*	Pass side A/C only	R4	21-1	21-2	21-3
20-134*	Pass side A/C only	Sanden SD508 or SD7	21-1	21-2	21-3
20-135*	Driver side Alt., P/S	N/A	N/A	21-2	21-3

* Requires application-specific installation kit except for standard short kit

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⚙️ The Roundabout

04 | The instructions list water pump options for each of the three balancer depth configurations. We opted for a truck pump with its upward pointing water outlet because it was less expensive. We found a good price on the water pump and other stock replacement pieces at Summit Racing.



05 | The Holley system bolts to the cylinder heads and not the block, which means it will work on any LS iron- or aluminum-block engine. Iron-block engines delete two block mounting holes on the driver side of the block face that are present on aluminum engines. We have already mounted the idler pulley to the bracket. The bracket includes two different positions for the idler that adjusts belt length.



06 | We give a gold star to the Holley designers for using the truck/early F-car alternator, which is less expensive compared to the Corvette alternator. This is the Holley PN 197-301 130-amp alternator included in the 20-143 kit.



07 | We discovered that a Saginaw style -6 AN fitting will hit the power steering pulley, which means you must use a dedicated high-pressure Saginaw fitting. This is a small point, but one worth noting if you were planning to use stainless braided hose.

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As an example, we recently upgraded our well-used 5.3L truck engine with a stronger COMP hydraulic roller cam and West Coast Racing Cylinder Heads CNC porting job on the stock cathedral heads, and we were looking for something better than the original truck system. The Holley brackets mount to the cylinder head for the alternator and power steering pump, while the

PARTS LIST

Description	Summit Racing PN
Complete system, Alt., A/C, P/S,	20-136
Complete Holley kit, Alt, P.S.	20-143
Holley bracket kit, Alt, P/S, A/C	20-131
Holley bracket kit, Alt, P/S, A/C	20-132
Holley bracket kit, A/C	20-133
Holley bracket kit, Alt, P/S, A/C	20-134
Holley bracket kit, Alt, P/S	20-135
Holley spacer kit	21-1
Holley spacer kit	21-2
Holley spacer kit	21-3
Holley alternator	197-301
Holley alternator wiring pigtail	197-400
Holley P/S pump	198-100
Holley P/S reservoir	198-200
Holley P/S pump pulley	97-152
Holley tensioner	97-151
Holley idler pulley	97-150
Holley R4 A/C pigtail	199-200
Truepart '98-'00 Camaro alternator	8272N
ACDelco truck water pump	19195104
Hayden tensioner w/ truck pump	5563
Truepart serpentine belt - 2,040mm	6PK2040



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The Roundabout

factory-style tensioner mounts to the water pump. This eliminates issues with iron-block engines that exclude two block accessory drive bolt holes present in aluminum-block engines. We ordered our system without A/C, but if you want conditioned air, there's a separate bracket that conveniently mounts the A/C pump up high on the passenger side.

Holley offers a tremendous variety of kits, ranging from complete systems with all the parts down to just the bare brackets and spacers that will require filling in all the myriad small parts. We ordered PN 20-143 to mount an alternator and power steering pump and added the spacer kit (21-3) for our truck balancer. With just those two part numbers we had all the major pieces we needed. We've included an application chart that breaks down all the different applications, including the different A/C pump options. We especially like that Holley engineers designed this kit to work with factory alternators, water pumps, power steering pumps, pulleys, and tensioners. As an example, they configured all the kits to use a truck/early F-body alternator, which is both plentiful and the least expensive of the LS chargers.

There are numerous options when it comes to selecting the correct water pump in order to match it to the balancer. As an example, if you choose to run the shortest Corvette style balancer, this requires a Corvette water pump with the correct pulley depth so the belt will line up. To help you with this decision, Holley has included one of the best instruction sheets in the industry. The 14 pages cover every step and list exactly which water pump and belt tensioner is required for each application. There are multiple variations within this area, and if you do not already have a balancer, it would be to your benefit to familiarize yourself with all the variables by reading the instruction sheet before selecting the kit. The instructions are available online at holley.com.

As mentioned, we were upgrading our iron LM7 5.3L truck engine, so we retained the stock truck balancer. Our engine did not come with a water pump, and the Holley instructions indicated we had a choice of either an LS3/L99 pump with a low-mounted water outlet or the standard truck-style pump that has an upward-angled water outlet. The LS3's lower pump outlet is the best choice if you are considering using a low-profile LS1/LS2/



08 | The power steering pump that comes in the 20-143 kit is a Corvette unit that uses a bearing, versus bushings used in standard Type II pumps. The windows in the pulley allow installing the pump to the bracket without removing the pulley. Solid-face pulleys require removal to access the pump mounting bolts. The P.S. pulley tool can be rented or borrowed, but it's a useful tool to own.



09 | The Holley system also uses a factory tensioner placed on the passenger-side cylinder head. The specific tensioner is determined by the water pump selected. The instructions for your system will indicate which tensioner to use.



10 | With the bracket torqued on the driver-side head, we mounted the power steering pump and the alternator in place. You have the option of remote mounting the power steering reservoir, but to keep things simple, we opted for Holley's 198-200 kit, which includes a GM reservoir and cap, pump hose and clamps, and the reservoir bracket.

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The Roundabout



11 | Holley also offers a specific pigtail (PN 197-400) that plugs into the alternator and is fitted with a built-in resistor so that you can connect this wire to any switched 12-volt wire connection. You can build your own harness if you connect the "L" terminal on the alternator to a charge indicator light or use a 560-ohm, 1/2-watt resistor (Radio Shack PN 271-1116).

LS6-style EFI manifold since the truck's outlet will interfere with air inlet to the throttle body.

Holley also makes specific recommendations for belt tensioners that must be used based on the style of water pump. Our search led us to obtaining most of these production-based parts from Summit Racing. We found several examples where prices of a quality water pump or a belt tensioner was far less expensive than new GM parts.

We've included a list of parts we used to complete our package, plus other options, but there are too many

variations to list them all. Remember that if you opt for just the Holley brackets, you have to obtain items like a power steering pump and pulley, an alternator, a tensioner, an idler pulley, a belt, and an alternator pigtail to complete this system. Of course, you can go the other way and buy the complete kit. When piecing the system together, the little parts can add up, but you're still saving money since you don't have to buy a balancer. The basic non-A/C kit 20-143 we ordered includes the alternator, power steering pump, pump pulley, and alternator pigtail.

12 | We followed Holley's directions and measured our combination and found a 2,040mm serpentine belt from Summit worked for our application. To install the belt, slip it over all the pulleys, leaving the water pump for last, compress the tensioner and slip the belt in place. We now have a complete serpentine system with all-new parts and ready to hit the road.



We still had a few parts to purchase like a water pump, a tensioner, and a belt, but the overall cost was still attractive. If you are starting with an engine with nothing except a balancer, the 20-143 kit and all the additional parts for a truck engine will run a little less than \$1,000. This is purchasing everything new from Summit Racing. If you are willing to use junkyard or previously owned parts, you could cut this price by at least \$300, which would assemble an entire accessory drive system for roughly \$700. You can't get a much better deal than that. **CHP**



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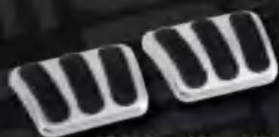


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JUST SAYIN

BY: Brian Lohnes



Get Out There And Fail

I am writing this about a week after the Indy 500 took place. For those of you living under a rock leading up to the race, Chevrolet had some issues with their cars taking flight after accidents during practice so the sanctioning body mandated changes to the aerodynamic package to stop that from happening. It was not only a fascinating case study in engineering, but it was also a fascinating case study in modern psychology and media. Why? There was a disbelief that the engineers that designed the aero package could have failed and created something that didn't work how they believed it would. The value of failure has been almost completely lost at this time and I think that's shameful. Whether in hot rodding or in life, failure is the single most important element in improvement. Don't believe me?



▲ Don Garlits' famous transmission explosion in March 1970 at Lions Drag Strip prompted him to build the first NHRA Top Fuel event-winning rear-engine dragster (Winternationals 1971). Although the design was not successful the first few times out, Garlits eventually got the car dialed in. The design would forever change the face of Top Fuel drag racing, which in turn became a much safer sport; a prime example of failure that eventually turned into success.

The early days of the U.S. space program were a complete disaster. The rockets blew up, the satellites failed, and we looked like a weak second fiddle to the effort being put forth by the Soviet Union. It would have been easy to pack it in and do something else, but after each failure a lot was learned, the program improved, and we were first to plant our flag on the moon.

Thomas Edison famously tried hundreds and hundreds of elements in the light bulb before he figured out a carbon filament was the ticket. What happens if he quits?

Don Garlits got his rearend handed to him at the first drag race he attended in California. Had he tucked tail and gone back to Florida, where would drag racing be today?

These are grand failures and they make good examples, but in your own evolution and growth in hot rodding, failure is important, too. You only drop a distributor in 180-degrees out and blow the mufflers off your car once before you learn to do it right. You only roll through the staging beams at the strip in front of your buddies once or twice before you get a handle on it and start trying to cut a light, right? Sure, you may murder cones like Jack the Ripper when you get yourself onto an autocross course for the first time but you get better with each lap. You need to do this stuff, you need to get out there and fail so you can understand what success is.

Lots of people might tell you that lack of money keeps them on the couch, or that they have not fixed

their car yet for some list of reasons, and I'm here to tell you that fear is the thing that keeps them from doing stuff. The idea that they may not be good at something the first time they try it or that their romping, stomping engine combo may not make the horsepower they want at a dyno day, or that someone may bust their chops for looking like a newbie is it, and the problem is growing.

Racing and hot rodding are fun because not everyone gets the trophy or the check, right? You can be as competitive with your peers or with yourself as you want. Do you want your Camaro to be a solid driver to haul the kids with? Do you want it to be a 100-point car? These are the debates guys have with themselves, and at the end of the day so long as they are doing *something*, that's all that matters. The more people that sit on the couch, the more people that fear failing, the weaker our sport and hobby becomes. That's the truth. Sure, it takes some guts to jump into the pool, and there will be people who question your sanity, but those people aren't worth listening to.

I failed hard the first time I announced a race. This year I am doing more than 30 events, writing columns like this, and even showing up on a small screen near you. If anyone appreciates the value of failure it is me.

Now ... get out there and screw something up!
I'm just sayin.'

Brian Lohnes is an NHRA National Event Staff Announcer and co-owner of Bangshift.com

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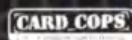
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